VOL. XXXIV JUNE, 1924 No. 6

THE LARYNGOSCOPE

AN INTERNATIONAL MONTHLY JOURNAL
DEVOTED TO DISEASES OF THE

EAR - NOSE - THROAT

For Contents See Page 1.

Subscription, $6.00 per Annum, in Advance.

Foreign Subscription, 35 Shillings per Annum, Post Free.
Single Copies, 75 cents.

PUBLISHED BY THE LARYNGOSCOPE CO.

3858 Westminster Place, St. Louis, Mo., U. S. A.

FOREIGN OFFICE, BAILLIERE, TINDALL & COX,
8 HENRIETTA ST., STRAND, LONDON, ENG.

[Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter, in July, 1896.]

THE
LARYNGOSCOPE.

Vol. XXXIV ST. LOUIS, JUNE, 1924. No. 6

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

HEMANGIOMA OF THE LARYNX.*

DR. RUDOLPH KRAMER AND DR. SIDNEY YANKAUER, New York.

Aside from their comparatively infrequent occurrence, hemangiomata of the larynx present many points of great interest. Not only from the standpoint of symptomatology and diagnosis, but, what is at times of vital interest to the patient, from the standpoint of therapeusis do they bring up questions that may perplex and stimulate the mind of the physician.

The bibliography of hemangioma of the larynx has been thoroughly investigated by Irwin Moore in 1922. In this article he has abstracted and critically reviewed the literature on this subject, and it would be an unnecessary repitition to go over this phase of the matter. Since the publication of Moore's article three cases of hemangioma have been reported and published (Fruhwald, Harris and Sweetzer) and a fourth presented at the Laryngological Section of the New York Academy of Medicine by Wolf in the Spring of 1923. It should be noted that only cases of true hemangioma have been included in this report. Cases of mixed growths, such as fibroangioma, have been excluded. Seventy-five unquestioned cases of hemangioma have been reported; the largest individual series were those of Solis Cohen and Roux with four cases each. We have observed fourteen cases of hemangioma of the larynx; eight of these in the past two years. In addition we have seen several mixed growths such as angiofibroma. These, as stated above, have not been included in this paper. In addition, we have had one case of combined lymph-

*Read before the Laryngological Section of the New York Academy of Medicine, February 27, 1924.

Editor's Note—This manuscript received and accepted for publication in Laryngoscope, March 1, 1924.

angioma and hemangioma, a hitherto unknown laryngeal lesion. This is discussed in another paper (Lymphangioma of the Larynx).

We shall first report fourteen cases of our own and then discuss these and the cases reported in the literature with particular reference to the symptomatology, diagnosis and therapy. Thirteen of our cases are from private practice and one from the Out Patient Department of the Laryngological Service of Mt. Sinai Hospital. We wish to acknowledge our indebtedness to Dr. F. S. Mandlebaum, director of the pathological laboratory of Mt. Sinai Hospital, for the histological examination of the material forming the basis of this paper, and for his kind and valuable assistance.

Case I. Female, school teacher, 32 years old, seen in 1909, complaining of cough. Septum deviated to left, follicular pharyngitis, cryptic tonsils, larynx negative. One year later a small growth, 3 mm. in diameter was noted on the anterior surface of the right arytenoid cartilage. Removed with cutting forceps (by indirect laryngoscopy). Well one year later. Section showed hemangioma simplex with moderate round celled infiltration.

Case II. Female, housewife, 44 years old, seen in 1917. Chicken bone swallowed, removed following day through oesophagoscope. Bone located 17 cm. from upper incisor teeth. Nine months later patient complained of pain and of dysphagia for a short time. Larynx congested, swelling (described as granulation) in interarytenoid space. Removed with cutting forceps, indirect laryngoscopy. Well six years later. Section showed hemangioma simplex.

Case III. Male, mechanical engineer, 46 years old, seen in 1917, complaining of hoarseness for six months. Patient had bilateral apical tuberculosis. Septum deviated to the right, spur left side, elongated uvula, pallor of pharynx. Tumor size of white bean, dark red in color, covered with vessels, ulcerated at one point, attached to anterior portion of left vocal cord. Removed by suspension laryngoscopy, local anesthesia. After removal of tumor, left vocal cord showed deep red, beefy infiltration. Well six years later. Section showed cavernous hemangioma.

Case IV. Male, 52 years old, seen in 1917, complaining of hoarseness of eight months' duration. Hoarseness at first intermittent, then continuous, gradually becoming more marked. He had had several attacks of acute articular rheumatism. A small tumor about 4 mm. in diameter was attached to the right vocal cord near the anterior commissure. It was dark red in color and covered with smooth mucous membrane. Removed with cutting forceps, indirect laryngoscopy. Well six years later. Section showed cavernous hemangioma.

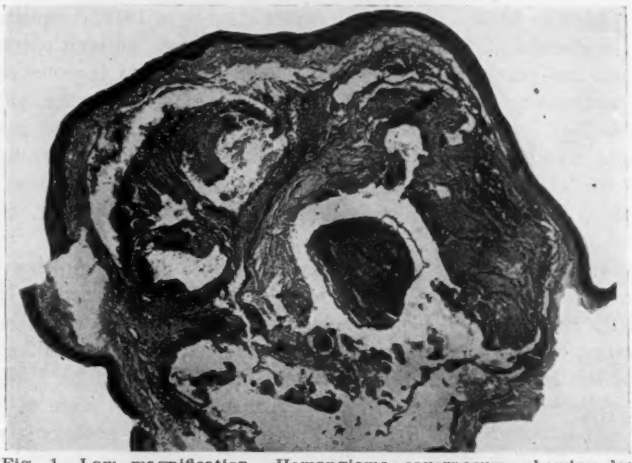


Fig. 1. Low magnification. Hemangioma cavernosum, showing large blood spaces of irregular size and shape. Numerous smaller vessels are scattered throughout the section. The dark circular area to the right of the center is hyaline material surrounded by a layer of endothelium, the whole mass lying free in a large blood space. Case IV.

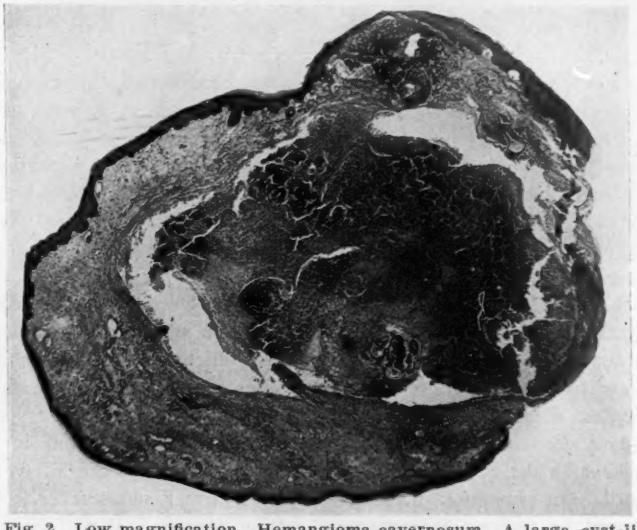


Fig. 2. Low magnification. Hemangioma cavernosum. A large, cyst-like space filled with blood occupies the greater portion of the section. Surrounding this space is markedly edematous stroma with numeorus blood channels. These channels are present in great numbers close to the large central cavity. They diminish in number as the surface of the growth is approached. It would perhaps be better to classify this growth as a hemangioma cysticum or hemangioma simplex with cyst formation. Case VII.

Case V. Male, salesman, 35 years old, seen in 1919, complaining of hoarseness of five years' duration. Vocal cord had been operated upon one year after onset of symptoms with relief for one year. Tonsillectomy in 1918. He had moderate nasal discharge, slight hawking; hoarseness coming on suddenly. Septum deviated to the right, tonsils and uvula had been removed. On the anterior third of the left vocal cord was a large smooth red tumor. Removed by cutting forceps, indirect laryngoscopy. Well four years later. Section showed a pigmented hemangioma simplex.

Case VI. Male, 48 years old, seen in 1920, complaining of hoarseness of four weeks' duration, following influenza. Had cough at onset. Septum deviated to right, marked congestion of pharynx, with redness and swelling of both vocal cords and left false cord. Ulceration posterior half right vocal cord. One week later (opposite the ulcer on right cord) an infiltration of left vocal cord was noted. Removed with cutting forceps, indirect laryngoscopy. Well three years later. Section showed hemangioma simplex.

Case VII. Male, salesman, 28 years old, seen in March, 1922, complaining of hoarseness for one year, with occasional cough. Septum deviated to the right, elongated uvula, small half buried cryptic tonsils. On the anterior third of the left vocal cord and in the left ventricle was a pedunculated, cherry sized, reddish growth. Removed under suspension laryngoscopy, general anesthesia. One week after operation a small nodule was noted on anterior third of the left vocal cord; removed by indirect laryngoscopy. A few weeks later another nodule was noted just posterior to location of above recurrence. Removed by indirect laryngoscopy, nine months later. Well at present. Sections showed cavernous hemangioma in all three specimens.

Case VIII. Male, 53 years old, seen in December, 1922, complaining of hoarseness for fifteen years. In addition he had nasal obstruction, anterior and posterior nasal discharge, frequent colds, cough with expectoration, clogged feeling in ears; mouth breather. Septum deviated to left, tonsils hypertrophied, half buried, cryptic. Small, deep red, raspberry shaped pedunculated mass 4 mm. in diameter on the upper surface of the anterior third of the left vocal cord. On phonation, mass became erect, firmer and smaller. Removed by indirect laryngoscopy, cutting forceps. Well. Section showed a cavernous hemangioma.

Case IX. Male, salesman, 32 years old, seen in December, 1922, complaining of hoarseness for two and one-half years, cough, slight bloody expectoration at times. On the anterior third of the left

Fig. 3. Medium magnification of area in another section, from case illustrated by Fig. 2, showing black amorphous particles which are greenish brown in the section (hematoxylin stain). Case VII.

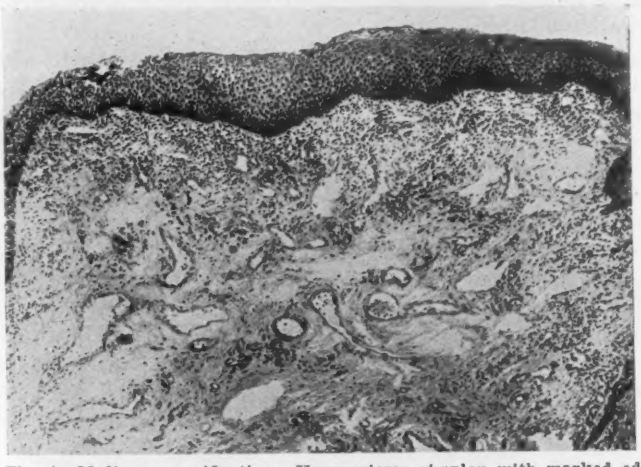


Fig. 4. Medium magnification. Hemangioma simplex with marked edema and leucocytic infiltration. Case I.

vocal cord was a purplish, smooth, pear shaped pedunculated mass, 4x6 mm. On phonation the mass became erect, smaller and firmer. Removed by cutting forceps, indirect laryngoscopy. Well when seen for last time two months after operation. Section showed cavernous hemangioma.

Case X. Male, tailor, 30 years old, seen in January, 1923, complaining of hoarseness of three years' duration, cough with mucoid expectoration, at times blood tinged. Nasal obstruction up to one year before consultation when nose was operated upon. Frequent

colds, anterior nasal discharge, supraorbital and temporal headache. Nose negative on examination. Tonsils small, buried. Congestion both false cords. Rosette shaped growth between right arytenoid and posterior commissure. Removed by indirect laryngoscopy, cutting forceps. Congestion of larynx and hoarseness continued under treatment with laryngeal injections and irrigations for five months, with gradual improvement. When last seen three months ago patient was well. Section showed hemangioma simplex.

Case XI. Male, lawyer, 42 years old, seen in November, 1922, complaining of hoarseness for one year. Septum deviated to right, tonsils small and free. At the junction of the anterior and middle third of the left vocal cord was a small sessile mass, which was smooth, red and globular. On phonation the growth became erect, firmer and darker in color. Removed by indirect laryngoscopy, cutting forceps. Well when seen seven months later. Section showed a cavernous hemangioma.

Case XII. Male, merchant, 37 years old, seen in March, 1923, complaining of hoarseness for two months following a "cold". Following pneumonia twenty years before present consultation, patient began to cough and expectorate large quantities of sputum especially in the morning. He had in addition, nasal obstruction, anterior and posterior nasal discharge, and frequent colds. Septum deviated to the left, hypertrophied three-quarter buried cryptic tonsils; congestion of larynx. On subglottic surface of the right vocal cord close to the anterior commissure was a small, round, sessile, pinkish tumor, 3x4 mm. which became erect, firmer and darker on phonation. Chest examination revealed a chronic fibroid tuberculosis of the right upper lobe, with marked cavitation. Removed tumor by cutting forceps, indirect laryngoscopy. Larynx and voice clear when the patient was last examined three months following operation. Section showed a cavernous hemangioma.

Case XIII. Male, lawyer, 37 years old, seen in March, 1923, complaining of hoarseness of five months' duration. Slight postnasal discharge, occasional cold. He had had a tonsillectomy performed six weeks before consultation. Septum deviated to the right, tonsils, uvula and edge of soft palate had been removed. Slight congestion of both vocal cords. There was a grayish red pedunculated mass 7 mm. in length attached to the anterior commissure and left vocal cord. The growth became erect, firmer and darker on phonation. Removed by indirect laryngoscopy, cutting forceps. Well when last seen two months later. Section showed a cavernous hemangioma.

Fig. 5. Medium magnification. Hemangioma cavernosum. The blood channel in the central portion of the micro-photograph shows several villous endothelial reduplications. There is marked edema of the stroma present. Other areas, not represented above, showed marked hyaline changes around the blood spaces. Case VIII.

Fig. 6. Medium magnification. Hemangioma cavernosum. The dark areas represent hyaline changes. Moderate edema of the stroma is present. Case XIII.

Case XIV. Male, merchant, 50 years old, seen in October, 1922, complaining of hoarseness of seven months' duration. On anterior fourth of both vocal cords a small, rounded, smooth red mass 2 mm. in diameter was seen. They were removed by cutting forceps,

indirect laryngoscopy, at intervals of about one week. Six months later, when last seen, patient was well. Sections showed cavernous hemangioma.

Hemangioma is a benign tumor originating from the blood vessels. There are two types of hemangioma, the simple and the cavernous. Hemangioma simplex is a new growth of blood vessels, the walls of which are more or less parallel to one another in the long axis of the vessel. The lumen is generally of small caliber and the endothelial lining usually consists of one layer of cells. The vessels are surrounded by a small amount of connective tissue. Hemangioma cavernosum is made up of irregularly shaped, comparatively large blood spaces. The endothelium may consist of several layers of cells which at times project into the lumen of the vessel in the form of papillae, valve flaps or interlacing bands. Instead of the usual pavement type of cell, the endothelium may be cuboidal or even low cylindrical. In the histological examination one must differentiate these two types of hemangioma from varix, submucous hemorrhage, mixed types of growths such as angiofibroma, markedly vascular granulation tissue and vascular types of malignant growths, such as angiosarcoma.

Secondary pathological changes in the tumor may be acute or chronic inflammation, thrombosis, hemorrhage into or external to the tumor, hyaline or amyloid degeneration and pigmentation. Cyst formation was noted in one of our cases. Multiple hemangiomata have been observed in connection with hemangioma of the larynx. These are generally facial, nasal, buccal or pharyngeal in location.

The etiology is unknown. The majority of investigators have leaned strongly towards the belief in a congenital origin. This view is difficult to harmonize with the fact that the great majority of hemangiomata occur in adult life; and furthermore, as pointed out by Sweetzer, the few cases observed in infancy and of undoubted congenital origin, differ markedly from the larger group occurring in later life. The type noted in infants is generally diffuse, sessile, subglottic in location and causes dyspnoea; that of adult life is more or less localized, projects distinctly into the lumen, is located on or above the cords and primarily produced hoarseness.

All our patients were adults between thirty and fifty years of age. Over 65 per cent of all previously reported cases were between twenty and sixty years of age. Eighty-five per cent of our patients were males, that is twelve of the fourteen cases. Seventy-five per cent of all previously reported patients were males. In some cases faulty or excessive use of the voice, severe coughing attacks, acute inflam-

Fig. 7. Low magnification. Hemangioma cavernosum. Fibrin collections in dense strands and masses both within and without the vessel walls. Slight hyaline changes present. The blood spaces are extremely irregular in shape and form intercommunicating cavities of labyrinthine complexity. Case XI.

Fig. 8. Medium modification area of Fig. 7. The paler homogeneous areas show early hyaline changes. Case XI.

matory lesions and trauma have preceded the appearance of symptoms calling attention to the tumor. In a few cases pulmonary tuberculosis has been noted, but not sufficiently often to be more than a coincidental feature. In one of our cases, cough was complained of and examination of the larynx revealed no lesion. One year later a hemangiomata was found. In another patient a chicken bone was removed from the oesphagus; nine months later a hemangioma was found in the interarytenoid space. In two cases pulmonary tuberculosis was present. In many of the patients nasal and pharyngeal symptoms have been marked. The relationship of irritation of the larynx, due to congestion, discharge and cough dependent on these lesions, to the causation of hemangiomata must be borne in mind. The appearance of hemangioma in adult life, in so high a percentage

in males, the sex exposed to greater irritation, the presence of definite irritative phenomena in so many of these cases, inclines us to the belief that these growths are due to an irritative stimulus of one form or another.

The subjective symptoms may be grouped under five headings; disturbances of speech, of respiration, of deglutition and of sensation, and hemorrhage.

Hoarseness was present in over 50 per cent of all cases reported. In a few cases voice tire, weak, rough or husky voice, voice break, veiled voice, difficulty of speech or of articulation, aphonia were noted. All our patients, except two, complained of hoarseness.

Dyspnoea was present in about 25 per cent of the cases previously reported. Stridor, suffocation and cyanosis were noted in a few patients. Croupy cough was present in 10 per cent.

Various forms of paraesthesiae, such as pressure in the neck, sticking, tickling, dryness, foreign body and uneasy sensations were recorded.

Dysphagia and vomiting were present in a small number of patients. Loss of weight, asthma, and sweating were rare occurrences.

Bloody expectoration was observed in over 15 per cent of recorded cases. The amount and the frequency of bloody expectoration varied; as a rule, the amount of blood expectorated was small.

Five of our patients complained of cough (two of these had pulmonary tuberculosis), two complained of bloody expectoration at times, and one had pain in the neck and dysphagia.

These symptoms are explainable on the basis of the location of the lesion. They should and did in most cases, direct attention to the larynx. The hemorrhagic phenomenon is merely a manifestation of the vascularity of the lesion, and the escape of blood from the tumor was caused by slight trauma incidental to cough, straining or similar acts. The duration of symptoms before examination by the reporters of the cases varied from two days to twenty or more years. Over 35 per cent of the patients had symptoms for years before coming under the specialist's care. The duration of symptoms in our cases ranged from four weeks to fifteen years. Several had symptoms for six months or less.

The laryngoscopic appearances were rather varied. The colors noted had in most cases a predominating reddish or purplish hue. Some were bright or "intense" red, others bluish or bluish-red, purple, violet, brownish blackish, or combinations of these. One was definitely described as white.

The description of the sizes ranged from millet seed size, 2 mm. diameter, pin-head size to chestnut, walnut, 4x3 cm., 1½x1¾ inches.

Fig. 9. Low magnification. Hemangioma cavernosum. Numerous villous endothelial reduplications and syncitial masses are present in the lumen of the blood spaces. Marked edema of the stroma is present. The darker areas represent fibrin condensations. Case XII.

Fig. 10. High magnification of area in Fig. 9. In places the endothelial cells of the blood space there is an endothelial proliferation having a valvular appearance. Case XII.

The majority of the cases were one cm. or more in diameter. More of the growths were pedunculated than sessile. The surfaces were described as smooth, warty, nodular, lobulated, or raspberry-like. The smooth appearance was rather uncommon.

Every part of the interior of the larynx has been found involved but most of the hemangiomata were situated on one of the vocal cords, those situated on the right cord being equal in number to those on the left. In earlier papers on hemangioma of the larynx, it was stated that the right cord was implicated about four times as frequently as the left, but on reviewing a larger number of case reports,

this statement is seen to be erroneous. The anterior half of the vocal cords was the seat of the growth in about 50 per cent of the cases. The false cords, ventricles, arytenoids, anterior commissure and subglottic regions have been involved in a few. The pyriform sinuses were involved five times, the lower laryngeal and upper tracheal regions, three times. Few statements as to the consistency of the growths were made; in two they were said to be hard.

All our growths were red or dark red in color except one which was grayish-red. They were 3 mm. to 7 mm. in diameter, white bean and cherry sized. More of the tumors were pedunculated than sessile; most of them had a smooth surface. One was raspberry-like in appearance. Several showed dilated superficial vessels. The anterior half of the left vocal cord was involved nine times, the anterior half of the right cord three times, the posterior commissure twice, and the right arytenoid once.

One of the symptoms of the greatest value in aiding diagnosis is the variation in the appearance of the tumor on respiration and phonation. On phonation the growth becomes erect, smaller and firmer and the color takes on a deeper hue. This phenomenon was observed by Menzel in a case of lymphangioma, and apparently no one after him had directed any attention to it. We have noted it in our last five cases of hemangioma. One must be careful not to confuse the passive flapping or motion up and down of a vocal cord growth, due to the expiratory and inspiratory air blasts. Close observation will readily distinguish this movement from the actual erection, firmness and diminution in size observed in hemangiomata.

The typical picture of a hemangioma is a small, pedunculated or sessile, reddish growth situated on the anterior half of a vocal cord in an adult male complaining of hoarseness which may have persisted for years. There is a much rarer type, occurring in infants, in which the predominating feature is respiratory distress. In these cases a circular subglottic diffuse growth is generally found.

The presence of symptoms referable to involvement of the larynx, such as voice changes, respiratory difficulties, interference with deglutition, or paraesthesiae of the upper respiratory tract, demands an examination of the larynx. This appears axiomatic, yet how often has a laryngeal examination been neglected and tonsillectomy and nasal operations been performed for the relief of these symptoms. Hemoptysis, a symptom often present in cases of laryngeal hemangiomata, has in several instances sufficed to condemn the patient as a victim of pulmonary tuberculosis.

A reddish or bluish tumor, especially if lobulated or raspberry-like, should arouse suspicions as to the presence of a vascular neo-

Fig. 11. Low magnification. Hemangioma cavernosum. Large, cyst-like cavity partially filled with blood cells occupying the greater portion of the illustration. Numerous smaller blood spaces surround this large area. Secondary epithelial hyerplasia on the laryngeal surface with moderate submocosal fibrosis and round cell infiltration. The fibrosis is probably due to the presence of large amount of greenish brown pigment around the blood spaces. Case IX.

Fig. 12. Medium magnification of area in Fig. 11. Moderate fibrosis and large amount of greenish brown pigment are present around the blood spaces. The pigment appears in the micro-photograph as fine dots closely resembling the red blood cells in the blood spaces. On the slide, the pigment is much smaller in size and greener in hue than the red cells. Case IX.

plasm. It is true that the color may vary from pink-gray, through all combinations of red and blue to a bluish-black, but the majority of these tumors are of a reddish hue. On the other hand every reddish or purplish growth is not a hemangioma; a great many fibromata and so-called polypi are reddish in color. The most characteristic symptom of a vascular growth is the phonation sign"; the

increased firmness, the erection, the slight diminution in size and the darker hue of the growth on phonation. This is true of lymphangiomata as well as hemangiomata, but the difference in color of the two types of vascular tumors is generally sufficient to distinguish them. One must bear in mind however, that a lymphangiomatous growth may be pinkish in color; the hemangiomata as a rule are deeper red.

The lesions from which hemangiomata must be differentiated are simple and specific granulomata, cysts, fibromata, varices, submucous hemorrhages and vascular malignant tumors. The granulomata are not covered with epithelium and they usually bleed very readily on touch; granulomata of marked vascularity are at times very difficult to distinguish even histologically from true hemangiomata.

Submucous hemorrhages, cysts and fibromata, if well supplied with vessels may closely simulate hemangiomata. The "phonation sign" may serve in differentiating them. It should be borne in mind that blood vessel growths may be cystic or may have associated with them hemorrhage into or around the tumor. Varices are generally flatter, less sharply demarcated and more diffuse than the small hemangiomata. The presence of the invasive tendencies of vascular malignant growths may be of some assistance in distinguishing them from a benign lesion such as hemangioma.

The congenital type of hemangioma must be borne in mind when an infant shows signs of voice or respiratory difficulty. Only once, has this type of lesion been recognized in life (New and Clark). In these days of direct laryngoscopy, it should not be necessary to decide upon the type of treatment without definite knowledge of the causative lesion. Direct examination, a procedure very easily carried out, and very definitely indicated, should reveal enough to give one definite information as to the nature of the lesion present.

In tumors of large size requiring extensive operative procedures, it might be desirable to have a definite pathological diagnosis before proceeding with attempts at eradication of the tumor. Under these circumstances, a biopsy, performed with cutting forceps and followed by chemical or galvanocautery cauterization of the cut surface if bleeding were profuse, might be performed.

Death occurred in two untreated cases from asphyxia; one other untreated case with dyspnoea showed a steady increase in the size of the tumor. The outcome of this case is unknown. There is no record of spontaneous cure of a hemangioma of the larynx. The prognosis following treatment apparently depends on the size and type of growth and the method of treatment. In all our cases, the

Fig. 13. Low magnification. Hemangioma cavernosum. The homogeneous areas around the blood spaces are hyaline material with numerous small vascular channels in the masses. These masses are probably old thrombosed blood spaces with hyaline degeneration. In the upper left hand corner the laryngeal submucosa is edematous and shows some round celled infiltration. The micro-photograph following this one is taken from the submucosal area. Case III.

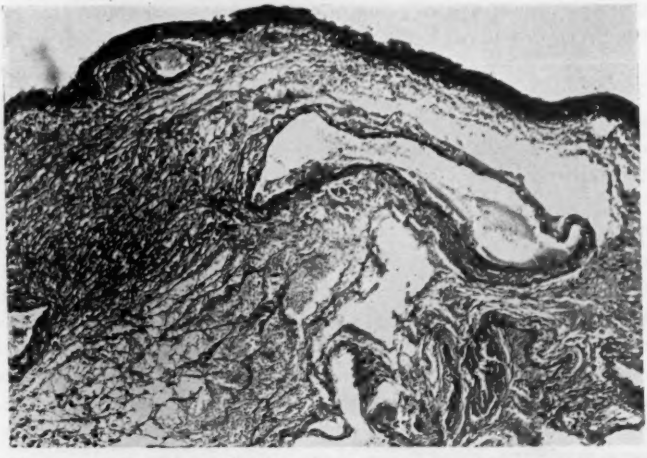


Fig. 14. Medium magnification, showing marked edema of stroma and fascularity of tissue surrounding a cavernous hemangioma. In the lower right hand corner are seen hyaline changes in the endo and peri-vascular structure. Case III.

cure has been complete up to the present writing, but some of them are too recent to warrant a definite statement as to the final outcome. One patient had several recurrences, or perhaps incomplete removal of the growth might better fit the circumstances, because of the

reappearance of the tumor within a few days after operation. This patient was eventually cleared up. Nineteen of the cases in the literature are reported as well, small numbers are reported as relieved, well except for slight hoarseness, size of growth diminished, or well except for cicatrized nodule. Recurrences were noted in four cases; in one the tumor persisted; in one other it grew steadily. Death occurred in three cases. Hemorrhage was the direct cause of death in one case, hemorrhage into the tumor with asphyxiation in another, and hemorrhage with pneumonia in the third. These three cases were all of the diffuse subglottic type with marked dyspnea.

Post-operative hemorrhage occurred in ten patients; in six others little bleeding was noted and in four others no evidence of hemorrhage was present. In one case post-operative hemorrhage necessitated tracheotomy. In none of our cases was there any post-operative hemorrhage.

In several cases dyspnoea was marked and treatment applied to the obstructing lesion was undoubtedly life saving.

There have been many methods of treatment applied and more proposed for the eradication of hemangiomata of the larynx. The great obstacle to the safe removal of these vascular tumors has been hemorrhage, and with the circumvention of this in mind, various chemical and electrolytic methods have been advocated and applied. In only one case has relief, and relief only, been obtained by chemical means. Present day methods and mastery of laryngeal surgery have narrowed the field of treatment to two types of procedure, surgery and radiation with radium and Roentgen rays.

All our cases have been treated surgically, twelve with indirect laryngoscopy and cutting forceps, two with suspension laryngoscopy and sharp dissection. One of the latter, operated upon in 1917, was the first hemangioma removed by suspension laryngoscopy, two years before Patterson and Pike's case. In not one of our cases was immediate or post-operative hemorrhage present. The removal of the growth at the first operation was complete in all cases except one which required two subsequent operative inventions to eradicate the growth. The anatomical and functional results in all our cases were excellent.

The majority of cases reported by others were operated upon per vias naturales. Nineteen cases were treated with cutting instruments, two with the cold snare, six with the galvanocautery, three with the cautery snare. The results were good in all these cases except one in which the galvanocautery was used, followed by crushing of the growth after failure of the cautery to check the growth.

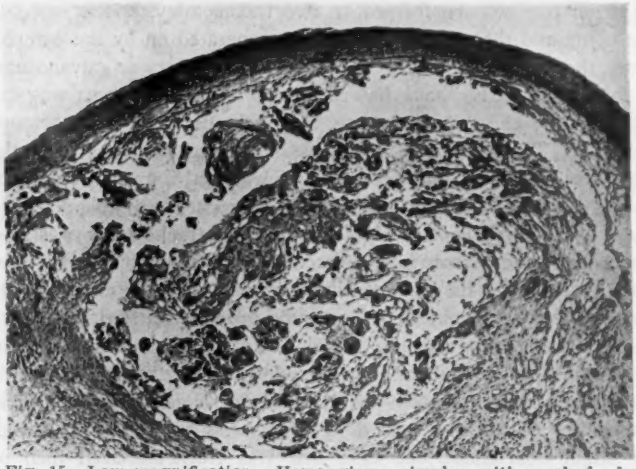
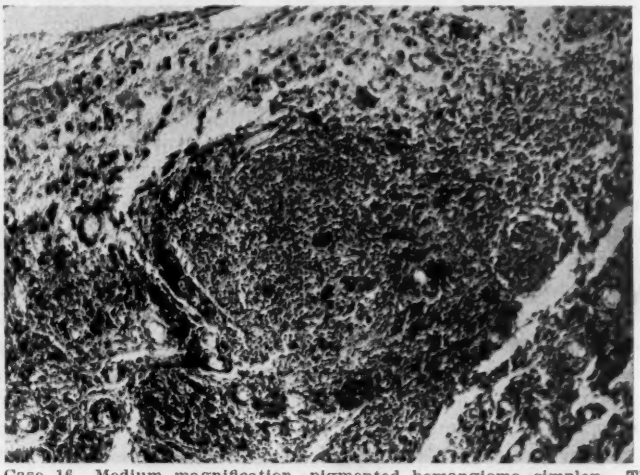


Fig. 15. Low magnification. Hemangioma simplex with marked edema of intervascular stroma. Scattered throughout the section are fine granules of greenish pigment. (hematoxylin stain). This pigment does not appear in the micro-photograph because of the low magnification. Case II.



Case 16. Medium magnification, pigmented hemangioma simplex. The black areas represent greenish brown pigment (hematoxylin stain). Surrounding the central heavily pigmented area of round cells and fibroblasts are vascular channels characteristic of hemangioma simplex. Case V.

Death resulted from hemorrhage followed by pneumonia. Two cases were operated upon with the suspension laryngoscope and dissection. In one case intubation was performed for dyspnoea. Eight cases were operated upon by the external route. In five of these cases

laryngofissure was performed, in two tracheotomy, and in one tracheotomy and thyrotomy. In the cases operated on by the external route, the growth was removed by the galvanocautery or galvanosnare in three patients, by sharp dissection or forceps in the remaining five laryngoscopy and cutting forceps, two with suspension laryngoscopy patients. The results of operative treatment per vias naturales with forceps or snare were as follows; in fourteen cases the results were excellent; in two snared off recurrence took place; in one case hemorrhage ensued after crushing, tracheotomy was performed and the patient finally succumbed to pneumonia. In three cases treated with the galvanocautery, the results were excellent; in one case the size diminished, in one the growth recurred, in a sixth case the tumor grew steadily. Two cases operated upon by means of suspension laryngoscopy and sharp dissection were cured; in one of these cases, however, post-operative hemorrhage necessitated tracheotomy. Two cases treated by laryngofissure were well except for slight hoarseness, one case that was tracheotomized died of hemorrhage. One patient intubated for dyspnoea died of asphyxia due in part, at least, to hemorrhage into the growth and surrounding tissues.

Radium was applied in five cases of hemangioma and in two of these intubation had first been performed for relief of dyspnoea. In one case recovery was obtained with the formation of a cicatricial node; in another, a case in which the diagnosis was inferential, relief was obtained; in a third the growth was still present although the patient felt relieved; in the fourth case, the result was unknown, and in the fifth, recurrence took place after forceps removal and radium, with a good result eventually after suspension laryngoscopy.

We have had no personal experience with post-operative hemorrhage in hemangioma, but from a perusal of the reported cases in which bleeding occurred either chemical caustics or the galvanocautery might serve in the control of this complication. In severe bleeding, tracheotomy and packing of the larynx might become necessary.

The presence or absence of a pedicle was apparently of little importance in determining the type of operative procedure. What was of greater moment was the size of the growth. The external route was followed in five cases, in which the growth was large, that is over 1 cm. in diameter, whereas only two of the cases in which the growth was small, described as pea or lentil size, were operated upon externally. Radium was employed four times in large growths and once in a pea-sized growth.

Judging from our own experience and from a consideration of the various procedures employed by other operators, we believe that all

of the smaller tumors should be operated upon by means of the forceps or snare, under direct or indirect laryngoscopy. The large tumors are best attacked by suspension laryngoscopy and sharp dissection. One must exclude the diffuse extensive growths occurring most frequently in infants and associated with dyspnoea. In these cases it would be advisable to employ radium in an attempt to eradicate or at least diminish the size of the growth. If relief of dyspnoea be immediately required, low tracheotomy would be preferable to intubation because of the danger of hemorrhage into the lumen of the larynx or into the growth or surrounding tissue, if the tumor were impassable. The tracheotomy should be a low one, for the danger of cutting into the hemangioma in a high operation is an ever-present and exceedingly serious one in these congenital cases. In a tracheotomized case it might be advantageous to apply radium intralaryngeally so as to get the effect of the rays directly on the growth and to avoid as much as possible, injury to the cartilaginous framework of the larynx. Radiation applied to small tumors does not appear to offer as complete an eradication of the growth as do operative procedures; furthermore, it is a more tedious and prolonged method of treatment. The presence of cicatricial residue on the cords with resultant vocal disability has been noted after radiation of hemangiomata. We believe that radium, preferably applied intralaryngeally whenever possible, should be reserved for use in the diffuse, more or less wide-spread lesions and for those cases in which recurrence takes place following apparently satisfactory operative procedures.

SUMMARY.

Hemangiomata of the larynx are clinically of two types; one occurring in adults, generally situated on the vocal cords and comparatively small in size; the other type, occurring in infants, large, diffuse, and subglottic. The type occurring in adults is much more frequently encountered than one would expect from the number of cases reported in the literature.

The growths in adults can be diagnosed clinically by the aid of the "phonation sign".

They lend themselves readily to removal by direct or indirect laryngoscopy with little or no post-operative hemorrhage.

BIBLIOGRAPHY.

SEILER: Trans. Amer. Laryngel. Assoc. 1884-65.

FERRERI: *Amer. Journ. Med. Science.* 1889, XCVII, 416.

SOLIS, COHEN: Ashhursts's Internation Encyclopedia Surgery. 1885, V, 727.

GLASGOW: *Journ. Otol., Rhin. & Laryn.* 1889, III, 50, Discussion.

KIDD: *British Med. Journ.* 1888, I, 584.
DESVERNINE: *Lancet.* 1888, I, 385.
GLASGOW: *Amer. Journ. Med. Science.* 1889, XCVII, 360.
BROWN, M. R.: *Journ. Resp. Org.* 1889, I, 46. Cited in Philip & Ruh's article Amer. Dis. Child, 1913, V, 128.
TAUBER: *Journ. Laryn. & Rhinol.* 1889, III, 13.
LOOMIS: Proc. N. Y. Path. Soc. 1890, 30.
GRANT: *Journ. Otol., Laryn. Rhin.* 1893, VII, 287.
RIEDA: *Journ. Rhin. & Laryn.* 1897, VII, 198 (abstract).
BEAN: North West *Lancet.* 1890, X, 70. Cited by Chiari Arch. f. Laryn. & Rhin., 1896, V, 100.
PANTOLINI: Arch. Prov. de Chir., Sept., 1897; also Centralbl. f. Laryn., 1899, XV, 33.
BOND: *Journ. Laryn. & Rhin.* 1899, XIV, 9.
HAMILTON: *Australian Med. Gaz.* April 20, 1899.
GORIS: Revu Hebd. de Laryn. 1889, I, 641.
SEIFERT: Munch. Med. Wochens. 1900, XLVII, 983.
FAUVEL: Traite Pratique des Mal du Larynx. 1876, 545.
HEINZE: Arch. Laryn. 1890, I, 134.
WOLFENDEN: *Journ. Laryn. & Rhin.* 1888, II, 291.
MARTIN AND WOLFENDEN: Studies in Path. Anatomy, 1888.
CHIARI: Arch. Laryn. 1896, V, 100.
JURASZ: Die Krankh. Ober Luftwege. 1891, 403.
HEYMAN'S: Handbuch d. Laryn. 1898, I, 810.
SCHROTTER: Vorlesungen u. d. Krankh. d. Kehlkopfe, 1892.
BROWNE: Throat, Nose and Diseases. 5th Ed., 1899, 219 and 658.
WINGRAVE: Journ. Laryn. & Rhin. 1906, XXI, 215.
PHILIP AND RUH: *Amer. Journ. Dis of Child.* 1913, V, 123.
SAFRANEK: Zeitsch. f. Laryn. 1912, IV, 353.
KELLY: *Glasgow Med. Journ.* 1906, LXV, 411.
WEBER: *Lancet.* 1902, II, 160.
HORN AND MOLLER: Arch. f. Laryn. 1908, XX, 159.
ELSBERG: N. Y. Med. Record. 1884, XXV, 21.
ELSBERG: Arch. Med. (N. Y.). 1884, XI, 12.
MACKENZIE: Growths of the Larynx. 1st Edi., 1871, pp. 53, 188, 312.
MACKENZIE: Disease of Throat and Nose. 1884, I, 307.
SCHWARTZ: Les Tumeurs du Larynx. 1886, 32.
COUPARD: Revue Mens. d. Laryn. 1880, 1881, I, 311.
TRASK: LARYNGOSCOPE. 1900, 116.
SHURLEY: Diseases Nose and Throat. 1900, 570.
BRADY: *Journ. Laryn. & Rhin.* 1901, XVI, 14.
BRONNER: *Journ. Laryn. & Rhin.* 1902, XVII, 118.
MEYER, EDMUND: *Internat. Centralbl. f. Laryn.* 1904, XX, 416.
BIOZZI: *Internat. Centralbl. f. Laryn.* 1905, XXI, 464.
INCHOFER: Arch. f. Laryn. 1905, XVII, 112.
SYMONDS: Proc. Laryn. Soc. London. 1904, 1905, XII, 102.
ST. CLAIR, THOMPSON: Proc. Laryn. Soc. London. 1904, 1905, XII, 130.
CARTER: LARYNGOSCOPE. 1906, XVI, 572.
MASSEI: Bollet. de Melathe del Orecchio. 1906, XXIV, 109.

GRUNWALD: Atlas des Kehlkopfes. 2nd Edi., 1907, pp. 104, 112.
MALZEW: Mitth. der Baz. Klinik. 1907, II, 556, abstract, *Centralbl. f. Laryn.*, 1907, XXIII, 295.
HIRSCH: Wien Klin Wochschr. 1908, XXI, 592.
HAMILTON: Wien Klin Wochschr. 1908, XXI, 592.
BLEGVAD: *Internat. Centralbl. f. Laryn.* 1910, XXVI, 93.
NAVRATIL: *Internat. Centralbl. f. Laryn.* 1910, XXXVI, 151.
PORTER: *Edin. Med. Journ.*. 1910, (New Series), IV, 223. Rev. Hebd. de Laryn, 1911, II, 409.
THHRBER: LARYNGOSCOPE. 1911, XXI, 878.
TOUBERT: Bull et Mem. Soc. Franc. de Laryn. Rhin. et Otol. 1912, XXVIII, 144.
FERRERI: *Centralbl. f. Laryn.* 1889, 90.
ROUX: Dissert (Toulouse), 1912.
RYERSON: *Journ. Canad. Med. Assoc.*, 1912, (old series.) XLI, (new series), II-III
MARTUSCELLI ET PORFIDIA: Grov. Intern. de Soc. Med. Napoli, 1914. (U. S.), XXXVI,, 210.
LEVBARG: LARYNGOSCOPE. 1918, XXVIII, 867.
MCKINNEY: *Journ. Laryn. & Rhin...* 1919, XXXIV, 49.
JOHNSON: Trans. Med. Chir. Soc. 1868, LI, 176.
MCCOY: Trans. Amer. Laryn., Rhin. & Otol. 1912, 35.
LOOMIS: *Semon's Centralbl.* 1890, 91, 264.
MAYER, EMIL: Trans. Amer. Laryn. 1916, 190.
DAWSON: Proc. Roy. Soc. Med. 1918-1919, XII, 100, (Section on Laryngology).
MOORE: Proc. Roy. Soc. Med. 1918-1919, XII, 100, (Section on Laryngology).
PATTERSON AND PIKE: Proc. Roy. Soc. Med. 1919-1920, XII, 180; also, *Journ. Laryn.*, London, 1921, XXXVI, 49-71.
NEW AND CLARK: Annal. Otol., Rhin. & Laryn. 1919, XXVIII, 1025.
CAVENAGH: *Lancet*, April 1, 1922, I, 635.
FRUHWALD: Mo. Natschr. f. Ohrenheilk. LV, 772.
SWEETZER: LARYNGOSCOPE. 1921, XXXI, 797.

780 Park Ave.

PRIMARY DIPHTHERIA OF THE MIDDLE EAR.*

DR. GEORGE F. KEIPER, LaFayette, Indiana.

Secondary infection of the middle ear from a diphtheria in the breathway is not uncommon. According to Duel, 10 per cent of diphtherics will show middle ear infection by the Klebs-Leffler bacillus. Primary diphtheria of the middle ear is rare judging from the comparatively few reports in literature. But I wonder if it is not more common than the reports seem to indicate. The past year alone produced two reports on this subject. Physicians seeing such cases either fail to recognize the disease or recognizing it are too lazy or indifferent to make reports for the benefit of others. Would it not be better to submit all aural discharges to the microscope instead of the few we are accustomed to investigate? This condition can best be diagnosed by a microscopic examination of the aural discharge fortified by a biological test upon guinea pigs. The clinical symptoms are to be carefully noted, for the discharge from such an ear is very characteristic, totally unlike other purulent otities mediae.

Permit me to place on record an additional case: April 8, 1922, Dr. J. W. Shafer of our city asked me to care for Dean T., age seven, who two days before became sick with a discharging left ear. An earache of rather marked severity preceded the rupture of the drum membrane. Prior to the rupture he had a marked elevation of temperature and was very fretful

Examination of the ear revealed a ruptured drum in the posterior inferior quadrant. Its color was that of washed leather. A fine whitish membrane protruded in the lips of the wound. Pus of a dirty white color and rather fluid exuded in moderate quantity. The left mastoid was tender.

He is a very nervous and sensitive child but mentally very alert in spite of his ill health which to the date of this visit permitted him to attend school only five months. His weight was 50 pounds; nutrition fair.

He had had measles and pertussis. For the past four years he was asthmatic. This has been complicated with repeated attacks of bronchitis.

His temperature was 103.6° and the respiration forty.

*Read before the meeting of the middle section of the American Laryngological, Rhinological and Otological Society, Detroit, Mich., Feb. 22, 1924.
Editor's Note—This manuscript received and accepted for publication in Laryngoscope, February 26, 1924.

The discharge from the middle ear looked more and more suspicious with each succeeding visit, so on April 10 we had a bacteriological examination made by Dr. Frank Hunter, our pathologist, and he reported the discharge a pure culture of Klebs-Leffler bacilli, which was also in due time lethal for guinea pigs.

He was immediately placed in the isolation building of St. Elizabeth Hopital and I asked Dr. Shafer to return to assist me in the care of his patient.

Pain and tenderness were present around the left ear. The right ear was normal in all respects. The left ear was very deaf. On account of the contagious nature of the trouble I did not make the customary tuning fork tests, etc.

His tongue was coated. His tonsils and adenoid had been removed. The fauces, post-nasal space and larynx were perfectly clean. Cultures from these spaces were entirely negative for Klebs-Leffler bacilli.

His teeth were normal. There was no adenopathy and the neck was freely movable. The eyegrounds were normal.

The chest sounds were normal. Likewise were the heart sounds. The abdominal organs were in place. The genito-urinary apparatus was normal. He had been circumcised. The urine was normal.

The skin was rather hot but moist, soft, clear and supple. The bones and joints were normal and likewise all reflexes.

The blood count on admission was as follows: leucocytes, 49,600; polymorphs, 80 per cent; small lymphocytes, 15 per cent; large lymphocytes, 3 per cent; mononuclears, 1 per cent; mast cells, 0; transitionals, 1 per cent.

Immediately on admission to the hospital he was given 10,000 units of antitoxin subcutaneously. At five in the evening he was given 20,000 units more. Antitoxin was also ordered dropped in the ear every four hours after thoroughly cleansing the ear. Heat was continually applied to the ear externally by the means of the Japanese pocket stove. The usual internal treatment was followed.

The next day, April 11, the temperature dropped to 100.6° and the day thereafter it was 99.4°. April 13, it reached normal.

Soreness and stiffness of the muscles of the body developed April 12. He was very fretful. This was probably a manifestation of antitoxin anaphylaxis. But as already noted his temperature had dropped and his pulse was regular, stronger and steadier.

He was still sore and fretful April 13, the discharge from the ear was decidedly less.

Another blood count was made April 14, as follows: leucocytes, 23,600; polymorphs, 71 per cent; small lymphocytes, 18 per cent; large lymphocytes, 5 per cent; mononuclears, 3 per cent; mast cells, 1 per cent; transitionals, 2 per cent.

The temperature was normal April 15, and it remained so during his stay further in the hospital. The Klebs-Leffler bacilli disappeared from the discharge promptly and none were found April 17. None were ever found in the nose and throat. The aural discharge ceased promptly. The drum remained perforated. The leucocyte count became normal.

A graphic record of his temperature and pulse is appended.

Attention is directed to two items in the treatment of the patient: (1) The prompt drop of temperature and pulse after antitoxin injections and (2) the prompt subsidence of the leucocyte count.

Large dosage of antitoxin is indicated. It should never be less than 30,000 units within the first twelve hours after diagnosis is established.

According to our best authorities severe cases of diphtheria as a rule run a leucocyte count of from 25,000 to 30,000. Ewing reports a case with 72,000, and Felsenthal one case with a count of 142,000 in complication with an hemorrhagic eruption. For so small a cavity as is the middle ear even including the mastoid process, a leucocyte count of 49,600 is enormous.

As stated in the prologue of the paper primary diphtheria of the middle ear is a very rare disease. The literature of the subject is very sparse. The earliest case report that have been able to find (with the help of the Library of the Surgeon General of the United States Army, the Department of Literary Research of the American College of Surgeons, and indices like that of the American Medical Association, etc.), is that of Kercher and Hirsch in 1888. In two of their cases a membrane covered with a fibrinous deposit infiltrated with streptococci and Klebs-Leffler bacili was found in each, post-mortem. The patients were children. The membranes protruded between the lips of the ruptured drum membranes.

The book of Billington and Dwyer has been quoted as furnishing a report of a case. I have carefully examined the book and can find no such record.

Kobrach's case was a boy 13 months old. For several days right-sided facial paralysis was apparent. There were no objective symptoms to indicate middle ear disturbance. Otoscopy revealed a slight reddening of the drum membrane. Myringotomy brought only a slight bloody discharge. The culture taken from this showed Klebs-Leffler bacilli after twenty-four hours. A guines pig inoculated with this produced death in twenty-eight hours and the bacilli were found in the edematous fluid in the abdomen. On the second day the left ear was inflamed and the specific organism was found in the discharge but mixed with other bacteria. On the eight day antitoxin (800 units) was injected. Two days later the right ear was dry. The left ear did not react well to the antitoxin and the discharge continued. Complete recovery was very slow. The facial paralysis gradually disappeared. The nose and adnexa were entirely free from any trouble whatsoever.

A very illuminating article is that of Daae's. He states that diphtheria in the middle ear acts just the same as in any other organ of the body. There may be no clinical symptoms and the discovery of the specific germ in the ear discharge will be necessary to establish a diagnosis. Daae's patient was eleven years old. The right ear was affected. The cause given was a cold.

The right ear drum bulged and was injected. Pain was present. The mastoid process was tender. Temperature was 40° C. The pulse was 160. Paracentesis was made with no change in the symptoms. The discharge from the ear was a bloody one mixed with greyish white sloughs.

Two leeches were applied Feb. 26, over and under the tragus. No improvement followed this procedure. Cultures showed cocci only. On March 1, a diagnosis of diphtheria was made and antitoxin was injected. Pain immediately became less. Klebs-Leffler bacilli were found March 2, in the nose and throat. On March 5, under chloroform anesthesia, the mastoid was opened. The periosteum was filled with blood and was adherent to the mastoid. The process itself was filled with pus and necrotic material. The lateral sinus was uncovered but it appeared normal. Ordinary dressings were applied.

The temperature dropped to 38° C., on March 7; on the same day a piercing pain appeared in the left side of the chest and the temperature rose to 39.9° C. The pain was worse the next day and the patient suffered with dyspnea. The patient lay on the

right side. The right eye became blind. No ophthalmoscopic examination was made. Diagnosis: embolic lung infection.

Vision returned to the right eye March 10. The mastoid healed in fourteen days. The embolic lung infection continued for fourteen days. Daae's conculsion is that primary diphtheria of the middle ear can be diagnosed only by a bacteriologic examination of the discharge from the middle ear.

Stein reported three cases: *Case 1* was a boy, ten years of age. The right ear after a day of pain began to discharge pus which excited no suspicion of the real condition present. The third day the left ear pained considerably, requiring paracentesis. Three days thereafter white spongy masses appeared in the depths of the external auditory canal. Examination of this revealed Klebs-Leffler bacilli. Repeated examinations of the nose and throat were entirely negative.

Case 2. Man, aged 41. Had coryza cough and backache. Right ear was painful for two days. The next day paracentesis was performed. Grayish-white masses appeared in the depths of the external auditory canal. Cultures showed diphtheria bacilli in great numbers; 2,000 units of antitoxin subcutaneously caused marked subsidence of all symptoms.

Case 3. Man, aged 55. For several days he suffered with coryza, occluded nasal passages, and a discharge of yellow mucous. Unbearable pain in the left ear. Paracentesis of the highly inflamed drum. No secretion. On account of pain second paracentesis was made six days thereafter. Klebs-Leffler bacilli were now found in the discharge; 1500 units of antitoxin caused the patient to improve markedly.

Professor Olimpio Cozzolino of Genoa, a pediatrician; Patient, a boy two and one-half years old, seen May 8, 1907. Had what appeared to be a glandular fever. There were no symptoms of angina, nor marked increase in the glandular swellings. The temperature ranged from 37.8° to 38.5° C. Marked pain in the left ear developed May 12. The temperature rose to 39.4° C. The drum was markedly hyperemic and bulged. Myringotomy was made. The next day a fibrous whitish membrane appeared in the wound and on removal caused a slight hemorrhage. He was then seen by Professor Massini, and 1500 units of antitoxin were given hypodermically. The next day the temperature dropped to normal. The right ear became affected May 15, and 1000 units of antitoxin were given that day, and four days later another 1000 units. The formation of membrane persisted

and locally antitoxin was dropped into external auditory canal. He made a complete recovery by May 16.

How did the middle ear become infected without local manifestations in the throat? I quote Cozzolino: "It may be supposed that the diphtheria bacillus were endowed with too slight virulence (and in the case which is my own they were too few in number which might explain their absence in the culture taken from the membrane) to develop a local morbid manifestation on the coarser mucous membrane of the throat, nose, naso-pharyngeal space or the eustachian tube, and that they found suitable soil on the more delicate membrane of the middle ear cavity."

J. J. Thompson reported eleven cases of primary diphtheria of the middle ear of which nine were of the pseudo type. The other two had true Klebs-Leffler bacilli showing. In the mastoid wounds made to relieve inflammation, healing was delayed and a whitish appearance was noted in the depths, from which pure cultures of the specific organism were recovered. Antitoxin administered subcutaneously promptly caused the disappearance of the membranes. The mastoid wounds promptly healed.

A differentiation must be made between the pseudo diphtheria bacilli and the true type. The latter will kill guinea pigs. The former will not.

Haskin's case was a man aged 51. He had a violent inflammation of the right ear. The drum was incised. He returned in a few days to the Manhattan Eye and Ear Infirmary with a very peculiar white exudate upon the membrana tympani. Pain in the other ear developed, a temperature of 101°, But the pain in the right ear had ceased. Cultures taken from the ears showed Klebs-Leffler bacilli. Biological tests were positive. No lesion was detectable in the nose or throat.

Vinsonhaler's case was in his own person. Colleagues had diagnosed the condition as influenza. The drum ruptured spontaneously and the pus contained the Klebs-Leffler bacilli in great numbers. 10,000 units of antitoxin were given and the trouble abated. The discharge ceased and the drum healed with little impairment of hearing.

Shoji's article is unavailable but Hoshino reviews it in the Annals of Otology, Rhinology and Laryngology, 1919, XXIII, 157, as follows: "In a case of middle ear suppuration, Shoji found a pseudo membrane in the tympanic cavity, without show-

ing any preceding symptoms of diphtheria in nose or throat. From it he definitely showed diphtheria bacilli microscopically, on cultures and by animal experimentation. After administering antitoxin serum and local treatment, the discharge decreased and the patient was cured. He also demonstrated the diphtheria bacilli in the patient's urine.

Bane's patient was an old gentleman past seventy years of age. A free serous discharge issued from the right ear. To insure free drainage a free incision was made in the drum. A grayish-white membrane appeared in the depths of the external canal. Culture showed diphtheria bacilli. Antitoxin was administered. The patient's recovery was very slow. After two months, the left ear became inflammed and incision of its drum was followed by the formation of membrane which cultured showed the specific germ of diphtheria. In due time recovery was complete. But the diphtheria bacilli were found in the pharynx without any local manifestations of diphtheria.

Robenhaven reports the case of a girl, four and one-half years old, who was sent to the hospital Feb. 14, 1919, as a diphtheria carrier. This was proven six days thereafter because that day she ran a temperature of 104°. Both ear drums were inflammed, the left one more than the right. Double paracenteses were made. Cultures from the middle ears produced the diphtheria bacilli. February 23, left facial paralysis was observed. The left mastoid was opened. Extensive destruction of the bone was found. The temperature not subsiding, the right mastoid was opened a few days later. From the left mastoid wound diphtheria bacilli were cultured. The recovery was stormy but with it all, the facial paralysis disappeared. At no time were any lesions observable in the nose and throat. Apparently, no antitoxin was administered. The facial paralysis was probably due to toxin created by the diphtheritic process.

This article makes reference to an article by Carli (in Bulletin from the University Clinic for ear, nose and throat diseases in Rome, 1917), and to one by Oscar Benesi (Wien. Klin. Wochenschr., 1912, No. 37, S-1385). But as this translation was received just a couple of days prior to this meeting sufficient time to look up these references was not available.

Pugnat in reporting a case states that diphtheria may localize in the middle ear without being preceded by angina or rhinitis. It gives rise to an acute otitis media with febrile symptoms characterized by the following triad of symptoms: (1) bulging of the tympanum as a whole or in any of its parts, or quadrants;

(2) serous, sero-hemorrhagic or hemorrhagic secretion containing whitish clots or sloughs formed of necrosed fibrin; (3) earache, always very acute which is not relieved until after the injection of antitoxin. The prognosis is relatively good provided the infection be recognized in its incipiency.

Blanchard's case was a private soldier, aged 22. who was admitted to the hospital February 9, 1922, with a "bad cold" in his head and a discharge from his left ear. No pain or discomfort preceded this trouble. The day after the right ear began to discharge. All the objective symptoms were negative. The temperature was 102°. The patient was light-headed. He was treated in ordinary fashion for five days with no improvement in his condition. Cultures then taken from the ear showed the specific bacilli of diphtheria. 10,000 units of antitoxin were given and by the eighteenth, the temperature had dropped to 99° and the day following it, was normal. On the twenty-seventh, he was dismissed to duty, cured.

Mellinger's patient was a child three years old, which had had repeated attacks of earache. He was a mouth breather. The right ear was affected. A culture gave pure diphtheria bacilli which gave a marked reaction on glucose buillon. One-half C. C. of this injected into a guinea pig was lethal in thirty-six hours. Post-mortem examination showed marked edema of the subcutaneous tissues and an abundance of fluid in the peritoneal cavity. The suprarenal capsules were markedly hyperemic.

The patient's parents refused to have antitoxin used. The patient recovered in twenty-one days. Mellinger makes a good point in insisting on the biological test to determine the true nature of the infecting germ.

Webber reports two cases: The first patient was C. M., aged 52. The right ear began to discharge a few days before the doctor first saw him. No particular pain annoyed the patient. The temperature rose to 102°. The discharge from the ear was a thin, watery one which under the microscope showed diphtheria bacilli in large numbers. 10,000 units of antitoxin were given and the temperature promptly dropped to normal in thirty-six hours, and the discharge ceased. Recurrence took place in two weeks with reaction in the nose and throat. A second dose of antitoxin restored normality.

The second patient was a child, aged three. Both ears were discharging and both mastoids were swollen. The temperature was 104.4°. Thirteen days after the first visit, a double simple mastoid operation was made. Klebs-Leffler bacilli were cultured

from both wounds. There were no manifestations in the nose and throat. A previous culture from the aural discharges contained only staphylococci, aureus. But no marked change in the patient's condition took place until antitoxin was given.

H. Rohden's patient was an athreptic child, eighteen months old. Paracentesis was made, yielding a serous fiuid. The pus next day contained the Klebs-Leffler bacilli. Fever continued unabated in spite of antitoxin in injection. Neither nose nor throat showed any manifestations of diphtheria. After fifteen days, myocarditis, diarrhea, albuminuria and subfebrile temperature developed. The ear discharge continued. Croup developed and in forty hours exitus lethalis, in spite of tracheotomy and more antitoxin. At autopsy, the trachea was found studded with pseudo membranes of yellowish color. The usual lesions of acute otitis media were present.

Conclusions: 1. This disease is rare, perhaps. Therefore, all suspicious, dirty, watery discharges from ears should be microscopically examined invariably.

2. Antitoxin in large doses is always indicated and for the average-sized child not less than 30,000 units within twelve hours for a starter. Nothing else will cause reduction in temperature and cessation of the discharge, promptly. It may also be instilled directly in the affected ear.

3. The disease can be diagnosed positively only by a bacteriological examination of the discharge from the ear together with a biological test to differentiate the true Klebs-Leffler bacilli from the false ones.

How the disease invades the middle ear without throat and nose manifestations is a problem yet to be solved.

BIBLIOGRAPHY.

KERCHER AND HIRSCH: 1888, Zeitschr. f. Ohrenh., Vol. XIX.
KREPUSKA: 1897, Pester Med. Chir. Presse.
KOBRACH: 1904, Archiv. f. Ohrenh., 62, Bd. H. 1-2, p. 21.
DAAE: 1906, Zeitschr. f. Ohrenh., 52 Bd., 3. H., p. 249.
STEIN: 1908, Zeitschr. f. Ohrenh., LVI, 324-327.
COZZOLINO: 1908, Congress Pediatrica Italian, 1907.
THOMPSON: 1914, LARYNGOSCOPE, 219-225.
HASKIN: 1914, Annals, O., R. and L., 450-453.
VINSONHALER: 1916, *Southern Med. Jour.*, Sept.
BANE: 1917, LARYNGOSCOPE, 626.
SHOJI: 1918.
PUGNAT: 1919, Rev. de Laryngol., etc., Par XL, 377-386.
ROBENHAVEN: 1919, Ugerskrift f. Laeger.
BLANCHARD: 1922, *Jour. A. M. A.*, LXXVIII, p. 1458.
MELLINGER: 1922, *Cal. State Journal Med.*, Apr.
WEBBER: 1923, Annals O., R. and L., Dec.
ROHDEN: 1923, Zeitschr. f. Hals, Nasen und Ohrenh. Mch.
BURKHARDT-MERIAN: Mentioned in Politzer's work on Diseases of the Ear, p. 422.

DISCUSSION BY DR. B. N. COLVER, BATTLE CREEK, MICH.

In looking back over my clinical experience, I can recall to have seen a few ear complications in diphtheria. None of these, however, were clinical cases of Klebs-Loeffler bacillus in the ear. I have had no case which clinically resembled the primary infection pictured so well by the essayist.

The essayist mentions the desirability of routine examination bacteriologically of the aural discharge. I believe this is an excellent suggestion not only from the standpoint of Klebs-Loeffler infection, but to differentiate other types of otitis.

The enormous leucocytosis noted in his case was indeed startling. It surely indicated an excellent body resistance against an active acute infection.

In Dr. Keiper's case he also noted symptoms attributed to antitoxin anaphylaxis. I wonder if these symptoms are not really due to horse serum anaphylaxis. Just this week I have been told by the traveling representative of a large pharmaceutical house that their biological laboratories were working on the extraction of the anti-bodies from the immune serum. This new type of antitoxin will be presented in concentrated strength in normal saline solution. The serum proteids are to be practically eliminated. Such a preparation, I believe, will be a valuable advance in antitoxin therapy.

Speaking of the antitoxin reminds me to mention my concurrence with Dr. Keiper's opinion that a large amount should be exhibited promptly after the diagnosis is made.

We have to consider three possible types of otitis related to diphtheria:

1. The primary infection discussed in this paper. This is rare.
2. The true Klebs-Loeffler bacillus infection complicating upper air tract diphtheria. This also must be relatively uncommon.
3. Suppurative otitis of heterogeneous bacteriology but arising as a complication in the course of diphtheria. This is less uncommon, though by no means of as high incidence as otitis in scarlet or measles. It is likely that in early diagnosed and properly supervised diphtheria even this type is quite uncommon.

When, as a medical student I was working in the pathological laboratory I became acquainted with a pathologist who seemed always to be finding unusual things. One day he told me "to be always on the lookout for the unusual". It is so easy for one to fall into the current of the usual, and in this way overlook the occasional rare and interesting case as it goes by. We are, indeed, fortunate today to have had our attention called to this unusual condition. I am sure that some of us who have heard this paper will see such a case and recognize it before we have gone far. I can add nothing to the pathogenesis, pathology or clinical picture as presented. I would be glad, however, to expand for a few moments on one point. This is the use of antitoxin by instillation in the ear. This was done by Dr. Keiper in his case, and was also mentioned as having been done in the case of Professor Cozzolino.

Apparently one of the characteristics of Klebs-Loeffler infection, whether primary or complicating a near-by infection, is the tendency of the bacillus to persist in the aural discharge for long periods. It is obvious that the briefer the residence of the bacillus within the middle ear, the better for the patient and the better for the ear.

My attention was accidently called to the possible value of diphtheria antitoxin used locally. About ten years ago a gentleman presented himself for examination of his nose. A small, whitish, follicular infection was noted on one tonsil. This looked like a low grade of Vincent's Angina infection. Examination, however, showed it to be a Klebs-Loeffler infection. The man was wholly without constitutional symptoms, and was surprised at the information obtained from the laboratory. An endeavor was made to eradicate the infection by the use of various disinfectants, such as silver nitrate, iodin, neosalvarsan powder, carbolic acid, etc., but the spot seemed to persist. It did not seem justifiable to use anti-

toxin injections. As an experiment a tube of antitoxin was obtained, and the area saturated by means of a cotton applicator. By the next day a decided difference was seen, and within two or three days the area had completely disappeared and was culturally negative.

A few years later, the problem of the diphtheria carrier as handled at Camp Custer met my attention. I recalled the experience noted above to the laboratory man, who was taking a daily culture from the nasopharynx and pharynx of the men in quarantine. He in turn discussed it with the captain in charge, who suggested that a trial be given. The average stay of the carrier had been about forty-two days. At the time the antitoxin was applied locally there were ten carriers who had been in the hospital about fifteen days. With the use of the serum sprayed into the nose and throat they were cleared in thirty days, or after fifteen days of this treatment. The next group of twenty that were studied had the serum spray from the beginning, and were discharged in ten days after three negative cultures in the throat and nasopharynx.

The attention of the C. O. was called to this unauthorized and apparently lavish use of antitoxin. He was not at all sympathetic with the idea, and ordered it discontinued. The quarantine curve of the carriers again went up. I believe that a short time after this a new C. O. took charge of the hospital. At any event, the medical captain brought the quarantine curve, with its variations, to the attention of the C. O., and was permitted to resume the topical use of the serum. As far as I know this procedure was continued at Camp Custer as long as the diphtheria carriers were being admitted.

I mentioned this experience to one of my colleagues. He recalled that about 1909, while he was in France, his little boy had diphtheria. The French physician, who attended him, prepared to give the antitoxin. Just before he injected it, however, he moistened an applicator and painted the infected areas in the throat. The rest of it was given as usual.

My next experience with the topical use of antitoxin was in a case of nasal diphtheria. I do not recall how much antitoxin had already been given hypodermically, but the amount had been great. In spite of this the pseudo-membrane completely filled the nose and the child was in a state of profound prostration. When called in consultation I suggested that five drops of antitoxin be instilled into each side of the nose every hour. The rapidity with which the tough, pseudo-membrane disappeared was amazing. Within forty-eight hours the nose was completely clear.

Within the last month I had an interesting case referred to our clinic. This case had a marked huskiness of the voice, which had been present for a few days. There was no fever and no evidence of constitutional symptoms except those incidental to the coughing and difficulty of breathing which she experienced. Examination of the nose and throat was negative. An examination of the larynx and trachea revealed a mass without evident inflammatory reaction in the subglottic region. The differential diagnosis seemed to be between carcinoma, lues and tuberculosis. The case was treated symptomatically and observed forty-eight hours. A little greenish exudate which appeared around the corner of the left cord on the third examination, made us suspicious of diphtheria. No exudate, nor discharge had been visible earlier. The laboratory examination confirmed the diagnosis. In this case beside the general use of antitoxin we instilled several drops three times a day intratracheally. The pseudo-membrane did not extend, but on the contrary soon loosened and was expelled. Just what part the topical use of antitoxin played in this case would be difficult to say.

I congratulate Dr. Keiper on his thorough research into the literature and on the bibliography as listed. He nicely differentiates the cases which have been reported, and I am sure the bibliography appended to his paper is the most authentic, complete and up-to-date that has ever been published.

SPASM OF THE OESOPHAGUS RELIEVED THROUGH THE NASAL (SPHENOPALATINE-MECKEL'S) GANGLION.

DR. GREENFIELD SLUDER, St. Louis.

Mrs. V., aged 50 years, consulted me May 15, 1923, saying that "for the last ten days that she could not swallow and that she was famished for food and drink and had lost ten pounds weight." Examination of the throat and nose showed them to be normal. I then gave her some water to drink and found her statement to be true. X-ray examination showed a closure (spasm) of the esophagus at the third, fourth and fifth dorsal vertebrae with the bismuth bolus resting on top of it.

Effort to relieve the spasm by cocainization of the nasal ganglion by application of one drop of a 20 per cent solution succeeded partially. The effect lasted one hour. This was repeated each day for increasingly stronger solutions, with more and longer effect. On the fourth day the ganglion was heavily cocainized by saturated (about 90 per cent) solution of cocain with complete relief. The spasm has not returned.

In the course of a subsequent general examination by Dr. Vernon Mastin a 4+ Wassermann reaction was found, and antisyphilitic treatment was then begun. She is now in much better health and has gained fifteen pounds weight. Syphilis may have been in some way the cause of the spasm. The antisyphilitic treatment may be the explanation of why it has not returned.

A general application of 20 per cent cocain was made to the throat as a control of gaging in the first examination of nose and throat. It did not help the spasm of the esophagus.

---

*From the Laryngological Department, Washington University School of Medicine, St. Louis.

Editor's Note—This manuscript received and accepted for publication in Laryngoscope, March 21, 1924.

NASAL (SPHENO-PALATINE) GANGLION PAIN SYNDROME ASSOCIATED WITH DISEASE OF THE MAXILLARY SINUS.*

DR. ARTHUR M. ALDEN, St. Louis, Mo.

The pain of acute or chronic maxillary sinusitis is quite characteristic and the diagnosis, as a rule, presents little or no difficulty, because usually the symptoms and signs together make a picture that is unmistakable.

However, we occasionally meet with cases where the signs are not typical or where there is an apparent contradiction between the symptoms and the physical findings as observed on examination. Such cases require careful study and often repeated examinations before a diagnosis of the exact pathological condition can be determined. The following case illustrates an apparent total contradiction between the symptoms and pathology that was understandable only in the light of the operative findings.

Miss A. H., aged 36, business woman, was referred to me with a complaint of headache and postnasal discharge. She stated that since childhood she had had recurrent headache usually affecting the right side, and becoming bilateral only when the pain was excessive. The headache usually started at the base of the nose, seemed to run back over the top of the head, and down into the neck and shoulders when the attack was severe. There was no periodicity, the pain coming on at almost any time of day, and was not made worse by use of the eyes. She stated that after a severe headache had subsided she often had a sore spot in her hair about 2 inches behind the right ear. She has rarely had sore throat. She has no recollection of having had pain in the face.

Examination showed small, submerged, otherwise negative tonsils, mild granular pharyngitis, ears negative. There was a slight deflection of the nasal septum to the right and the anterior tip of the right middle turbinate was in contact with both the septum and lateral wall of the nose. On first examination no pus was seen by either anterior or posterior rhinoscopy. The nasal ganglion district in the back of the nose appeared normal on each side. She was referred to the radiogapher for some sinus plates and told to return the next time she had a severe headache.

X-ray report: "There is marked clouding of the right maxillary sinus and right ethmoids. Otherwise the sinuses appear clear."

*From the Laryngological Department, Washington University School of Medicine, St. Louis.

Editor's Note: This mss. received in The Laryngoscope office and accepted for publication March 25, 1924.

The patient returned to the office four days later with an acute exacerbation of pain behind the eye and down the right side of the neck, which was entirely relieved by a 10 minute application of 2 m.m. of 90 per cent cocain over the right nasal ganglion. No pus was seen in the nose. Two days later she returned with another headache and the right antrum was punctured and irrigated and a small amount of muco-pus washed out. Inspection of the antral mucosa by means of the nasopharyngoscope inserted through an opening made in the naso-antral wall under the inferior turbinate revealed polypoid degeneration of the mucosa lining the sinus. Several subsequent washings each showed a moderate amount of muco-pus in the antrum.

Apparently there were here two separate pathological conditions, a chronic, suppurating antrum as shown by the objective findings and X-ray; and an irritative lesion of the nasal ganglion as evidenced by the type of headache and the fact that it could be entirely controlled through the ganglion. The patient's chief complaint, referred to the pain while her principal objective finding was in the right antrum. It was decided to operate first upon the antrum and then inject the ganglion later.

A modified Caldwell-Luc operation was done upon the antrum and when the external wall was removed it was seen that most of the pathology was located in the roof, above and behind and around the ostium instead of on the floor, as is more common. A large amount of thick polypoid mucosa was removed from this region and the operation finished in the usual way. Two weeks after the operation the patient stated that she had been free from headache for five days and a month later the headache had entirely disappeared and the nasal discharge ceased.

The only conclusion allowable in this case, namely, that the ganglion symptoms were the result of the diseased antrum and were relieved by appropriate operative interference to the antrum led me to examine closely some head sections to determine just what the anatomical relations between these two structures were. I found that in the majority of my specimens the posterior superior wall of the antrum is paper-thin and this with its mucosa is all that separates the antrum from the anterior lining of the spheno-maxillary fossa. The ganglion is usually placed posterior in the fossa and interposed between the ganglion and the anterior bony wall is, as a rule, a layer of connective tissue and a small plexus of blood vessels. Probably the fact that in most cases the pathology in antrum disease is largely limited to the floor and nasal wall, explains why we do not see this symptom complex more commonly.

3858 Westminster Place.

FURTHER OBSERVATIONS ON NASAL GANGLION NEUROSIS.

DR. CHAS. B. WILLIAMS, Mineral Wells, Texas.

At the 1923 meeting of the Texas State Medical Association I presented a paper before the Section on Ophthalmology, Otology and Rhino-Laryngology on "Nasal Ganglion Neurosis: Observations as to Possible Endocrine Aspects". At this time I wish to present some further, and I hope quite practical, observations on nasal (spheno-palatine, Meckel's) ganglion neurosis in the hope that more general interest may be aroused in this subject.

Sluder[1] has called attention to a number of isolated symptoms of this disturbance, including glossodynia, otalgia, nausea, parageusia, vertigo, scotoma, photophobia, rhinorrhea and asthma, and recently Green and Sluder[2] published a most interesting and instructive communication on painful accommodation arising from the same source. To these I would like to add the apparently isolated symptom, oculo-orbital pain (pain referred to the globe and deep in and around the orbit). I say apparently isolated symptom because in practically every case of this kind that I have seen, patient questioning has sooner or later elicited a history of other symptoms of the lower-half headache syndrome (tenderness behind the mastoid, stiffness of neck, pain about shoulder or scapula, etc.), leading me to feel that in my cases at least, the prominent symptom has so obscured others that no attention was paid to them by the patient, and that after all, I had not found truly isolated symptoms.

By way of emphasis, I want to say that in justice to ourselves and our patients, we should always keep in mind a possible neurosis of the nasal ganglion when searching for the cause of any obscure pain about the head, neck and upper extremities. As examples I report cases one and two.

Case 1: Mrs. J. A. H., age 28, presented herself in Feb., 1923, for relief from a most persistent earache. The pain was so intense that tears were streaming down her face when she entered the office and she insisted that I put something in her right ear at once to relieve her. Inspection revealed a perfectly normal tympanum. I suggested that we try applications in the nose instead of the ear, assuring her that the ear appeared perfectly normal, whereupon she promptly informed me that she had been advised

Editor's Note: This mss. received in The Laryngoscope office and accepted for publication April 10, 1924.

that she had a bad ear trouble, and came near leaving the office without permitting me to do anything. Finally, however, she consented to the nasal application and 10 per cent cocain to the region of the right nasal ganglion relieved the earache within five minutes. She was not yet thoroughly convinced, so I had her return in two hours, by which time the ear was paining considerably again. A second application of cocain completely relieved her again and she gave up the battle. A few applications of silver nitrate kept her free of otalgia for about a year, when she returned again saying that recently she had been having slight pain in the ear again and wanted it given attention before it got severe. At this time she had some uterine trouble which received attention.

Case 2: Mrs. M., age 38, following influenza, developed pain in and about the right eye of such intensity that she insisted on morphia for relief. Having once treated a left sided vacuum frontal sinusitis in this patient, I immediately suspected the same again. Ewing's sign was negative, however, and shrinkage, followed by suction, gave no relief. The eye and nasal passages appearing normal except for marked lachrymation, I applied cocain to the nasal ganglion about an hour following the use of suction. This gave complete relief within ten minutes, and in this instance permanent relief, for she had no further pain.

Localized inflammatory areas need not exclude the nasal ganglion from consideration, as the following case will show:

Case 3: Mr. E. A. S., age 32, introduced the subject of a sore and painful left eye by saying to me that if I could not do more for him than had been done, he didn't need my services. The left eye presented a typical picture of episcleritis with the addition of a deep-seated pain in and about the eye, which he said would not let up. There being no uveal or iritic involvement to account for the pain, I suspected a disturbance of the nasal ganglion and elicited a history of a stiff and painful neck and left shoulder with which he had been troubled from time to time. Cocain to the region of the left ganglion completely relieved the pain within a few minutes. Daily applications of this followed by silver nitrate relieved the pain and cleared the eye within ten days, nothing being used in the eye but a boric acid lotion, which he had already been using.

This patient's family history revealed that his father had been a sufferer from hay-fever and that three brothers all suffer from headaches of a severe type, notwithstanding the fact that all wear glasses, as does the patient himself. A basal metabolism test on this patient gave +18. A search is being made in this case to

ascertain, if possible, the underlying cause (probable toxemia) aside from that of heredity.

At present it appears to me that there are two fundamental considerations as to the etiology of nasal ganglion neurosis—viz., heredity involving the endocrines and the autonomic nervous system, and infection (toxemia). Whether in heredity (constitution) the primary instability be in the endocrines or the autonomic system does not matter, because both are involved and both must be taken into consideration as latent causes in all neuroses, while infections (toxemias), acute and chronic, offer the exciting causes in nasal ganglion as well as many other neuroses. I feel that the same probably holds true in the protein sensitizations, such as hayfever, asthma, urticaria, migraine, rhinorrhea, gastro-intestinal anaphylactic crises and other anaphylactic states—that is, that heredity offers the latent, while infection supplies the exciting cause in the great majority of instances.

Treatment: Treatment naturally resolves itself into local for the immediate relief of symptoms, and constitutional in the endeavor to rebuild a stable understructure. For the former, topical applications of silver nitrate, following a weak solution of cocain or other local anesthetic. I usually begin with 2 per cent silver nitrate and rapidly increase to 50 per cent or even 75 per cent. Injections of alcohol sometimes give gratifying results when other methods have failed. For the latter (constitutional), eradication of any and every source of toxemia anywhere, together with endocrine support where indicated, without which (attention to the general system) I believe the chances for permanent or prolonged results to be very greatly reduced.

CONCLUSIONS.

1. In searching for the cause of any obscure pain about the head, neck and upper extremities, neurosis of the nasal ganglia should be kept in mind.

2. Coincident inflammatory processes need not eliminate the nasal ganglia from consideration.

3. Fundamentally there appear to be two factors for consideration in nasal ganglion neurosis—viz., heredity involving the endocrines and the autonomic nervous system, and infection (toxemia).

4. Treatment should be local for immediate relief and systemic in the endeavor to add permanency.

1. Sluder, Greenfield: Jour. A. M. A., Dec. 2, 1922.
2. Green, John Jr, and Sluder, Greenfield: Jour. A. M. A., Nov. 24, 1923.

ACRIFLAVINE AND NEUTRAL-ACRIFLAVINE; THEIR HISTORY AND USE IN AURAL SURGERY.

Dr. James H. Mendel, Philadelphia.

The post-operative treatment of acute and chronic mastoiditis by means of acriflavine solutions, has given such satisfactory results, in both the Jefferson and Germantown Hospitals, during the past two years that a discussion of the subject is imperative.

Acriflavine is in the form of small reddish brown crystals. Recently certain manufacturers have compressed the compound and are presenting it as a tablet. It is soluble in water 1 to 5; in alcohol 1 to 40; and in glycerin 1 to 4 or less. It is compatible with solutions of sodium chlorid of 5 per cent and under, and also with 0.5 per cent sodium citrate solution. It is incompatible with eusol, Dakin's solution, or any of the chlorin antiseptics; also with solutions of phenol in dilutions of 1 to 20. It is insoluble with liquid paraffin, vaseline, or eucalyptol. Solutions may be boiled or heated in an autoclave to 130 degrees without disintegrating.[1] [2] Newly prepared solutions should be kept in dark bottles as the drug is sensitive to light and disintegrates rapidly when exposed. Solutions should also be dated and the drug not used if thirty days have elapsed since its initial preparation; its potency becoming lessened each succeeding day. The solution usually employed is of a 1 to 1000 strength in normal salt solution.

At the conclusion of the simple mastoid operation, before the lowermost suture has been taken in the posterior incision, a piece of gauze that has previously been in the wound is removed, and, before the cavity has a chance to fill with blood, a gauze drain saturated with a 1 to 1000 solution of acriflavine is lightly packed into the newly-made fossa, an effort being made to have the gauze come in contact with all surfaces. One, two, or more drains may be used, depending upon the extent of the involvement and the size of the resulting cavity. The final suture is now taken; the ends of the drain or drains, depending on how many are used, are allowed to project through the caudal end of the incision. A drain, about six inches in length and saturated with this solution, is lightly packed into the canal. The parts are cleansed with sterile water, alcohol, and, lastly, iodin is gently daubed over the sutures. A gauze sponge is cut, so as to allow the auricle to remain uncovered, and,

after being saturated with this solution, is placed over the wound. Other dressings, dry, are placed upon this, and the bandage applied in the usual manner. Dressings are changed daily, the gauze drain loosened, a small piece withdrawn and cut off each day until the third day, when all is removed and a new saturated drain inserted. This drain is now changed daily until such time as it can be omitted. The drain in the canal is changed daily, dating from the conclusion of the operation; its function is, of course, to maintain the lumen in a canal that may perhaps collapse, and to promote firm union of the integument where it has been separated from the bony walls during the operation This drain should be packed fairly firmly, but not tight enough to cause the patient any discomfort.

A rubber tube may be used for drainage instead of the gauze as described. Of late this has been the method employed, in that the patient experiences no discomfort on the withdrawal of the tube, whereas the daily changing of the gauze drain is fraught with some pain. Of course using this form, the acriflavine does not come in contact with the tissues until granulations are well developed. Both methods have proven satisfactory; it lies with the operator to select the one most suited to the case. When draining by the tube, the first layer of gauze over the wound is saturated with the solution.

In radical cases after the skin incision has been closed, the cavity is dried with sterile gauze, and gauze drains, saturated with this solution are gently packed into the denuded area through the canal; using as many as are necessary to fill the cavity and canal. The incision is cleansed as in the simple cases, a gauze dressing cut to shape and saturated with the solution applied; the head being bandaged in the usual manner. Each day the dressings are changed; the drains are loosened, withdrawn slightly and a small piece of each cut off; taking in all four or five days to remove all the drains. New saturated drains are now inserted and changed daily until such time as they can be discontinued. These packs prevent exuberant granulations from forming, and healing is much accelerated. The sutures, linen being used in both the simple and radical cases, are removed from the third to the fifth day, and on this day the cavity is packed as herein described, before their removal; to pack afterwards may cause the entire wound to gap wide open, thereby defeating the original purpose of the sutures.

An acute otitis externa of a most severe type will return to normal in an incredibly short time if the canal is packed with

gauze strips which have been saturated with acriflavine solution of 1 to 1000 strength, these packs being changed daily.

The denuded, irritated and inflamed areas, so frequently observed among the poorer children in the out-patient departments, where mastoid dressings have slipped, or the patient has not been dressed for many days, or the whole side of the face is chafed from an exceedingly irritating discharge from the canal; such wounds heal most rapidly when wet acriflavine dressings are applied and changed daily.

The history of the drug itself is intensely interesting. The compound is the result of experiments carried on by that master of synthetic chemistry, Professor Erlich, at the same time that his investigations of the arsphenamines were in progress. His idea was to determine, if possible, the therapeutic value of the anilin dyes and their various modifications. His searches led him to the acridin groups, especially acridin yellow, which seemed to have some therapeutic properties when used upon animals infected with the trypanosomes of African sleeping sickness. His extensive investigations had led him to discover that the introduction of chlorin or the others of the halogen group to any compound greatly increased its bacteriocidal activities; thus two such atoms of chlorin added to cresol increased its bacteriocidal power 250 times the unchlorinated cresol. He later discovered that the methyl group, CH_3, in a compound has a tendency to decrease germicidal properties. He found it was much simpler to introduce a chlorin radical to the compound than to take away the methyl group already there. This he did, producing acriminium yellow, whose therapeutic value showed a startling increase over the original compound. He and his co-worker, Benda, then attempted to eliminate the objectional methyl group, and after exhaustless effort were successful, producing a demethylized acriminium yellow possessed of even more remarkable bacterial power than its predecessor. They called this new compound proflavin. Experiments showed that proflavin had a tendency to coagulate human blood, so these two men began studies for the elimination of this not wanted and dangerous feature. In time they replaced the H_2SO_4 radical attached to the nitrogen in proflavin with a methyl group and an atom of chlorin, but in so doing a meager amount of hydrochloric acid was unavoidably introduced into the drug. This new product Erlich found to be most effective against infections caused by trypanosomes in animals, hence he labeled it trypaflavin, which name it still bears in Germany. At this

time Erlich's attention was directed to other matters and he neglected further experiments with the dye. With his withdrawal all German interest seemed to lag and the new compound was introduced into England, where it assumed the name of flavin. This term was soon discontinued because of a yellow dye of the same name and the appellation acriflavine decided upon, the British government issuing patents for its manufacture under this name only.[2]

To C. H. Browning[3] of Glasgow and his collaborators, Kennaway, Gulbranson and Thornton, we owe the greater part of our knowledge concerning the therapeutic value of the dye. These men advanced the theory that the perfect antiseptic must have all of the following properties:

First, it must exert great potency against all micro-organisms in the presence of protein material, as, for example, blood serum.

Second, it must have no inhibitory influence upon phagocytosis.

Third, it must cause no irritating action on living tissues in general, so that it may be applied with perfect safety to delicate surfaces, as, for instance, mucous membranes.

Fourth, it must exert a suitable stimulating effect upon connective tissue cells, so as to promote growth of healthy granulation tissue.

Fifth, it must be, when absorbed, not highly toxic to any specialized tissue.

Let us now consider these various points in detail; first, its potency against all micro-organisms in the presence of serum or any other tissue protein. To quote from Browning:[3] "Flavin is distinctly increased in its effectiveness as an antiseptic by the presence of serum; and further, this, among all substances tested, is the only one of high antiseptic potency which more than maintains its efficiency in serum. The antiseptics tested with this object in view included phenol, iodin, hypochlorites, and the other chlorin antiseptics, malachite green, mercury perchlorid, crystal violet, etc. When tested with staphlococci in the presence of serum it is twenty times more powerful than mercury perchlorid and 800 times more so than carbolic acid and chlorimine T as a bacteriocide. *The members of this group of diamino-acridin derivitives, in the presence of serum are the most potent bactericidal agents known and the property of being enhanced in this activity, by serum, is shared by no other type of chemical compound that has been investigated.*" This marked potency against bacteria in the presence of serum, also mani-

fests itself in that solutions of acriflavine are quite capable deodorants; it is exceptional that a fetid odor is noted when mastoid dressings are changed daily, although in this respect I do not think it is as efficient a deodorizing agent as potassium permanganate. Most antiseptics are fixed by a chemical union when coming in contact with protein material. This explains the fact that antiseptics in common use lose their potency when in the presence of serum; for example, bichlorid of mercury forming an insoluble albuminate of mercury. This non-soluble protein compound forms a deposit on the surface of the wound, whose usual function is that of a splendid fertile media for the proliferation of the invading organisms. Since solutions of acriflavine form no layers of dead tissue when coming in contact with the body cells, the penetrating power of the drug is greatly increased. Being a bright yellow dye it is good policy to warn patients of its staining properties, although with care, there will be no inconveniences experienced. Stitch abscess is indeed rare in mastoid cases treated by the method described. Only one has been encountered in our series of over one hundred typical cases, and that was due to the fact that the dressings had not been changed daily. It had totally disappeared the day following the application of clean wet dressings. In those cases where the tissues covering the mastoid process are greatly thickened, edematous, discolored, and perhaps contain an abscess or a sinus tract—acriflavine, or any other drug to my knowledge will not prevent small stitch abscesses from forming and the original sutures sometimes pulling out. It has been recommended[5] that injections of solutions of flavin in this boggy tissue will bring about more rapid resolution. This latter procedure has not been employed by us, consequently we are in no position to comment upon it.

Second, its non-inhibitory influence upon phagocytosis. Most antiseptics, to be of any use as a bacteriocide, must be employed in such strengths that they destroy the life of the cells themselves and thereby inhibit phagocytosis, depriving the body of one of its most important weapons in combating local infections. Phenol[3] kills organisms and hinders phagocytosis at dilutions of 1 to 500; mercury perchlorid exerts both influences at dilutions varying from 1 to 7000, to 1 to 10,000; acriflavine inhibits B. Coli at dilutions of 1 to 100,000 and staphlococci at dilutions of 1 to 200,000, whereas, in order to hinder phagocytosis a concentration greater than 1 to 500 is necessary. *"Clearly the higher the germicidal power and the lower the point of phagocytic inhibi-*

tion, the more valuable a drug becomes." Reports have shown that iodin in the presence of serum, is an antiseptic of only moderate potency; at the same time it is markedly inhibitory to phagocytosis and highly irritating.[3]

As to the third point, its non-irritating properties Solutions of flavine are absoluely non-irritating, irritation is conspicuous by its absence. I have never seen a mastoid wound, treated daily with this solution, show the slightest irritation; by that I mean the characteristic hyperemic area surrounding the margins of the incision, that is almost invariably observed when other methods are employed. Sir Anthony Bowlby makes this statement. Flavine does not sterilize fresh wounds. Various bacteria grow freely in wounds treated with it. At the same time irritation of the wound or surrounding tissues is rare."[4]

The fourth point, the stimulation of the growth of granulation tissue. My experience has been that solutions of flavin do not stimulate the formation of granulation tissue, if so, very slightly, but, at the same time, I am thoroughly convinced that the development of exuberant granulations in healing wounds is definitely retarded. There appears to be a very thin yellowish film over the healing tissues, this may be nothing more than the slight stain, but the wounds seem to be unusually healthy and pus is not present in any great amount.

The fifth and last point, its toxicity. This drug is non-toxic when used as a wet dressing in 1 to 500 and 1 to 1000 strength, no matter how much is used nor how often the dressings are changed. Acriflavine, in itself, is a drug dangerous for intravenous medication because of the hydrochloric acid contained therein, although 300 cc. of a 1 to 1000 solution have been injected into the blood stream of a man without any serious consequences. At present there is a new compound on the market, neutral acriflavine, in which this acid has been removed without destroying in any way the potency of the drug. It is claimed to be less irritating than acriflavine when applied as a wet dressing, although in this respect I have seen no irritation when either were used. The neutralization of the hydrochloric acid makes it much more safe for introduction directly into the blood stream.

When so used I have found reactions practically nil and results more than had been hoped for.[6] Its use intravenously is endorsed by Snyder of the New York City Hospital, Gerbat of the Lennox Hill Hospital, New York City, and D. H. Levy, also of New York; the results obtained by these men have been most startling as to its effectiveness. I wish to state at this point that

neutral acriflavine[7] is now and has been for the last half of this series, our choice; it has all the advantages of acriflavine plus a wider adaptability.

To summarize the points both for and against its use the following become apparent:

First: it is a bright yellow dye and stains everything with which it comes in contact; this objectional feature can, with care, be overcome to a certain degree.

Second: solutions, when made, should be dated and kept in dark bottles. Thirty days after their preparation they begin to lose their potency and should be discarded.

Third: its remarkable efficiency against all micro-organisms is little short of marvelous, leading all known antiseptics in this respect.

Fourth: it is absolutely non-irritating, non-toxic, and does not inhibit phagocytosis.

Fifth: it does not stimulate the growth of granulation tissue, but at the same time it lessens pus, keeps the wound unusually clean, and prevents the formation of exuberant granulations, thereby promoting rapid healing.

Sixth: it is a fairly effective deodorant.

Seventh: stitch abscess is rare in cases treated by this method.

Eighth: its use in cases of otitis externa is strongly recommended.

Acriflavin has so successfully met all conditions allied against it and has proven its power to such a conclusive degree, that its employment in various disease conditions should be most carefully studied.

In closing, be it clearly understood that I am not recommending acriflavine as a panacea or cure-all; I wish simply to direct your attention to a drug that has proved most satisfactory in the treatment of the conditions hereing described.

REFERENCES.

1. New and Non-Official Remedies, p. 25, 1922.
2. Martindale, W. H. and Wescott, W. W.: Extra Pharmacopoeia, 17 Ed., Vol. 1, 293.
3. Browning, C. H., Gulbransen, R., Kennaway, E. L., and Thornton, L. H. D.: Flavine and Brilliant Green. *B. M. J.*, 1-17, 73.
4. Bowley, Sir A., Drummond, H., and McNee, J. W.: Treatment of a Series of Recently Infected War Wounds with Flavine. *Lancet*, 11-17, 640.
5. Ligat, D.: Flavine and Brilliant Green in the Treatment of Infected Wounds. *B. M. J.*, 1-17, 78.
6. Neutral acriflavine for intravenous use is specially prepared and is known as Neutral Acriflavine "Pro Injectione"—National Aniline and Chemical Co.
7. Manufactured by the National Aniline and Chemical Co.

1923 Spruce street.

VENTRICULITIS (INFECTION OF THE SINUS MORGANI).

DR. EMMANUEL M. JOSEPHSON, New York.

In the course of examination of a large series of laryngeal cases the writer frequently observed among the chronic laryngitides which baffled the routine of treatment, a type of laryngitis which is almost entirely confined to the Sinus Morgagni. This finding confirmed a suspicion long held by the writer as to the potentialities of pathology of the Sinus Morgagni and its possibilities as a focus of chronic infection, and also offers a clinical counterpart for the frequent evidences of pathology of the ventricle observed by him in laryngeal preparations.

The onset of the condition is usually acute. The first signs observed are generally dryness in the throat and a change in pitch and weakness of the voice. Pains of an intermittent character radiate to the ear and the clavicular region. Tenderness is present over the cricoid cartilage on one or both sides. Coughing is not a predominating symptom, especially in the chronic stage. A characteristic of the disease is vocal asthenia and intermittent aphonia. The voice is feeble and asthenic—sometimes scarcely audible in severe cases. Aphonia is frequently present in the morning, and may endure throughout the day. This aphonia does not clear up, usually, until the patient has managed to cough up a tenacious mass or ball of sputum, a process called by them "clearing the throat". (This process of "clearing up the throat" may be performed mechanically by the physician by removal of the mass of mucus from between the ventricular band and the vocal cord.) The condition herein, described which the writer has found convenient to designate "Ventriculitis", may clear up within several days after the acute onset, but frequently endures as a subacute and chronic condition of a stubbornly persistent nature.

Laryngoscopy reveals the following. In the acute stage there is a general laryngitis with especially severe involvement of the ventricular bands and shortly after the onset a pronounced mucus secretion from the ventricles. The vocal cords are usually moderately congested and appear to be dryer than normal and in some cases they may be covered with crusts and ulcerated, due to

Editor's Note—This manuscript received and accepted for publication in Laryngoscope, February 15, 1924.

discharge from the ventricle. The ventricular bands are thickened, often puffed out, or pouched, in the center, due probably to the accumulation of a viscid, thickened mucus in the ventricle. This mucus mass may be seen covering the inner half of the cords. It is usually so thickened that in spite of movement of the cords and the ventricular bands, it retains its form. The ventricular bands are not only thickened but are sometimes also broadened, so that they completely cover the cords even during phonation. In all cases the mobility of the ventricular bands, which is essential to proper phonation, is more or less severely impaired. In the subacute and chronic stages the ventricular bands and the ventricles are almost exclusively involved. The vocal cords may be in no wise functionally impaired; paresis of the m. vocalis is not the rule in the subacute and chronic cases.

This being but a preliminary report but two cases of a typical nature will be detailed.

Case I. J. E. Male. Age 28. First attack. Onset afebrile and attributed to excessive smoking and overheating of home (hot air heating). Sense of dryness of throat and change in pitch of voice first noted. On the following morning the patient noted a sense of fulness in the throat and occassional pains radiating to ears and shoulders. Voice was feeble until throat was cleared by voluntary cough and a mass of mucus brought up. Occassionally there was a spontaneous cough.

Physical examination revealed a mild pharyngitis and laryngitis. The vocal cords were slightly congested. The ventricular bands were markedly swollen, injected and impaired in mobility, covering the cords during phonation to about the same degree as is normally the case when coughing. A mass of thickened viscid mucus protrudes from the ventricle. Bilateral tenderness is present over the cricoid cartilage.

Course. The condition cleared up under routine treatment, local application and light therapy within 72 hours. For several days thereafter the throat felt "scratchy".

Case II. A. T. Male. Age 30. Chief complaint was loss of voice intermittently over a period of three years. The onset of the condition had been an acute "cold". For the past three years the patient's voice intermittently failed him. This occurred more frequently in the winter time. On arising in the morning, the patient must clear his throat before he can speak. A spontaneous cough loosens and brings up a mass of mucus, whereupon he can once again make himself heard. On some occasions these coughing efforts

fail to accomplish their purpose and the patient remains aphonic throughout the day, sometimes for a longer period. The condition is associated with uni- or bilateral pains radiating usually to the ear, and occasionally with hemorrhages from the throat. Examination revealed a moderately congested larynx. The vocal cords were slightly injected and appeared to be a bit dry. The ventricular bands were red, thickened and hypertrophied, and in the center they were ballooned out as if by an accumulation of mucus within the ventricle (Sinus Morgagni). They almost completely cover the cords in all positions of phonation, and from between them and the cords there exuded a jelly-like mass of mucus, which retained its form in spite of cord movements, and could be removed en masse by means of a properly bent applicator. Tenderness was present over the cricoid cartilage. The patient's voice was asthenic, at times scarcely audible, and tired readily. Examination was otherwise negative.

Course. The patient is still under treatment, and under the treatment described below is showing promising improvement. Lungs and sputum have been negative.

The symptoms described in case II, is the type of onset frequently met with in tuberculous laryngitis. Examination of pathologic specimens has convinced the writer that the Sinus Morgagni is often the site of initial lesion of tuberculous laryngitis. In the early stages one finds tubercles in the ventricle and, in the later stages, ulcers.

Treatment. The routine treatment of chronic laryngitis is adopted. In addition, the removal of the mass of mucus from the ventricle and topical applications within the ventricle by means of a properly bent applicator have proven of value. Light therapy has also proven effective.

It will be noted on laryngoscopic examination of the normal patient that on the effort to phonate the ventricular bands as well as the cords approximate the mid-line. At the beginning of phonation the ventricular bands are slightly retracted for the lower tones, and markedly retracted as well as elevated for the falsetto tones. On the phonation of falsetto tones it will be noted that the ventricular bands vibrate visibly. This vibration of the ventricular bands appears to account for the "breaking" of the falsetto note.

The mechanism of these retractions of the ventricular bands may be surmised to be the muscle fibres of the thyro-arytenoid externus which insert into the bands. The degree of their contraction appears to parallel that of the mm. vocales. On the formation of falsetto

notes the muscles of the larynx are under high tension, which is sustained for only brief intervals during the phonation of the note, as one may readily observe by palpating the larynx.

The more or less complete closure of the ventricular bands during gagging and coughing is probably dpendent on the mechanism of sphincteric closure of the aditus ad laryngis. The writer had occasion to observe sphincteric closure during the course of extirpating a larynx. The closure was observed to involve not only a rotation of the arytenoid on its axis, but also a sliding and tilting forward of that structure.

230 East 79th St.

ACUTE MASTOIDITIS, APPARENTLY PRIMARY, IN AN INFANT SEVEN MONTHS OF AGE.*

Dr. Arthur J. Wagers, Philadelphia.

The title of this report suggests at once that there is some question as to whether or not the mastoiditis found was the result of a primary or secondary infection.

The history in the case is briefly as follows: The baby, W. B., Jr., was referred to the hospital by Dr. B. P. Steele, for such treatment as might be deemed necessary. Questioning the mother, who brought the child, it was learned that there had been no previous illness other than a "cold". For two weeks previous to admission the child had been fretful, showed slight elevations of temperature, and by more or less constant movement of the hand in the direction of the left ear, had attracted attention to that organ. It was not until four or five days before coming to the hospital that swelling was observed behind the auricle. This swelling had rapidly increased. At no time had there been any discharge of pus into the external auditory canal.

Examination on admission revealed the following conditions: Child was well nourished, somewhat fretful, with a temperature of 99.3°. Attempting to make an otoscopic examination of the external auditory canal and membrana tympani, it was at first thought that the canal was practically closed by swelling. The ap-

*Read before the Philadelphia Laryngological Society, Feb. 5, 1924.

Editor's Note: This mss. received in The Laryngoscope office and accepted for publication March 17, 1924.

parent swelling was found to be a hardened mass of cerumen lying against the posterior wall. When this mass of cerumen was removed the entire canal was found to be free of swelling and the drum membrane with all its landmarks clearly visible. The only variation from the normal was a slight duskiness of the drum. Inspection failed to indicate a suppurative ototis media.

Behind the auricle, the entire mastoid region was found to be markedly swollen and fluctuation easily elicited. There was no question as to the presence of pus within the swollen area. What was the actual condition present—a primary subperiosteal abscess, or a subperiosteal abscess secondary to infection within the mastoid process? The former seemed much more probable since, because of the apparent non-suppurative middle ear and the entire absence of swelling or bulging of the posterior and superior walls of the external auditory canal, the presence of a suppurative mastoid was very much doubted. But one learns to expect the unexpected in mastoid diagnosis and it was with this thought in mind that I prepared to operate—first, on an abscess outside the mastoid cortex, and, second, on the mastoid itself should the first step uncover indications for the second.

Operation: Under general anesthesia, the usual post-auricular mastoid incision was made, exposing and draining the expected abscess. The soft parts were retracted in order to expose the mastoid cortex. After rather a prolonged and seemingly fruitless search for a perforation of the cortex, a minute drop of pus was finally observed pushing its way through a slightly roughened area of the bone posterior to the external auditory canal. This served to remove all doubt and the cortex was opened, revealing a mastoid process in which there was almost complete breaking down of the bony cells and the cavity was filled with pus and granulation tissue. All of this was removed as in any simple mastoid operation. It was then deemed advisable to incise the ear drum in order to remove any doubt as to the question of suppuration in the middle ear. This was done. No pus was found at this time nor during subsequent treatment. The mastoid wound was dressed and treated in the usual manner and recovery took place without complications.

Was this a case of primary mastoiditis without a pre-existing otitis media? It seems to me that an answer based on the known facts in the case is bound to be in the affirmative. Text-books refer to primary mastoiditis as a "rare condition". Hempstead, in June, 1923, reports three cases seen in the Mayo Clinic, and in the same paper states that a careful review of the English and American literature, reveals but 26 reported cases since 1915.

There are those who hold that infection of the mastoid never occurs as a primary condition, with the possible exception of the rare case in which it is believed the infection has been carried by the blood stream directly to the mastoid region.

There is a great deal of theorizing—a great deal of assumption connected with the study of these cases. We assume, and the assumption appears so reasonable as scarcely to require proof, that infective bacteria reach the middle ear from the naso-pharynx by way of the Eustachian tube. We know that the surface of the mucous membrane lining the Eustachian tube and the middle ear cavity, is covered with ciliated epithelium, and we are taught that the movement of this ciliated epithelium tends to propel all matter thrown on its surface from within outward—that is, from the middle ear toward the pharyngeal orifice of the tube. I think we may accept this point as an established fact. But how, then, does the germ in the naso-phaynx ever find its way to the middle ear? In order to answer the question, we are obliged to assume that either as a result of general systemic disturbance, as in scarlet fever, measles, influenza, etc., the motility of the cilia is for the time arrested, thus removing the principal source of interference to the passage of organisms through the tube, or else we must conclude that the middle ear invasion is accidental or the result of external forces sufficient to overcome the natural opposition afforded by ciliary movement.

In passing, it might be asked why infective bacteria do not sometimes establish themselves and form an abscess within the Eustachian tube. It is quite possible that infection does occur within the tube at times, but because of the adequate drainage provided by the tube itself, it is not to be expected that an abscess would be formed of such proportions as to become clinically evident.

Whatever may be the facts concerning the passage of infective germs through the tube, certain it is that in numerous instances they do succeed in reaching the middle ear cavity and there initiate inflammatory reaction. We may reasonably assume that the swelling incident to inflammation of the mucous membrane is sufficient to effectually close the middle ear outlets, on the one hand by way of the Eustachian tube, and on the other by the aditus ad antrum leading to the mastoid cells; thus confining the subsequent suppurative process to the middle ear until such time as an artificial outlet is formed, either by spontaneous rupture or by incision of the membrana tympani.

It is taught by many that in every case of acute suppurative otitis media there is more or less involvement of the mastoid. This

may be true as far as the congestive stage of inflammation is concerned, but certain it is that the suppurative stage is but seldom reached in the properly treated case of suppurative otitis media. To explain suppuration within the mastoid in the usual case in which it is clearly secondary to a suppurative otitis media, we assume that the barrier produced by swelling in the aditus was not sufficient to prevent the passage of the infective agents from the middle ear. If we are correct in the assumptions so far expressed, is it unreasonable to assume that there may be an occasional instance in which the infective germ is able in its progress to overcome the obstacles encountered, not only in the Eustachian tube, but in the middle ear as well, and eventually find its way into the cellular region of the mastoid process before finding conditions suited to the establishment of an inflammatory reaction which is to result in pus formation?

If we can accept such a course of reasoning as representing a fair conception of what actually takes place, then, in the case herein reported, it is not difficult to explain the absence of pus in the middle ear as due to the fact that when inflammation occurred within the mastoid, the consequent swelling in the antral region was sufficient to prevent the return of the infective agent to the middle ear. Finally, if there can be any doubt as to the order of infective process as is implied in the title of this report, that doubt arises only from the fact that the condition was not under the personal observation from the onset of the trouble and it is possible that a mild suppuration in the middle ear may have subsided before the patient was sent to the hospital. At the time of admission and operation it was unquestionably a case of a suppurative mastoid without a suppurative middle ear.

The Lenox, 13th and Spruce.

THE TRAP-DOOR ESOPHAGOSCOPE.

Referring to my description of this instrument in the April, 1924, issue of THE LARYNGOSCOPE, an apology is due Dr. Harris P. Mosher, for my apparent discourtesy in not recognizing the fact that priority in the use of a slot in the end of an endoscopic tube belongs to him. My error was due to my having approached the matter from a different angle; which is an explanation, not an excuse. I hasten to disavow any claim to originality and I wish to apologize to Dr. Mosher. CHEVALIER JACKSON.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

December 26, 1923.

A Case of Frontal Sinusitis with Perforation of Both Anterior and Posterior Walls of the Sinus. (Post-Operative.) Dr. John Leshure.

Miss M. E. L. was first seen February 20, 1922, and complained of pain and tenderness over the right frontal sinus. Examination revealed a high posterior deviation of the nasal septum to the right, and hypertrophy of the right and left inferior and middle turbinated bodies. There was a moderate amount of purulent discharge in the right superior meatus. The right antrum and ethmoid showed a slight shadow under transillumination. The condition cleared up after a few days' treatment with shrinkage and suction, and the patient was not seen again until January 31, 1923, when she complained of pain and tenderness over the *left* frontal sinus. Apparently the right side had completely cleared, for transillumination was negative on the right, with a shadow over the left frontal, ethmoid, and antrum. There was considerable muco-purulent discharge in the superior meatus. This was treated for a few days, when the patient was found to have scarlatina, and she was under the care of her family physician for the next three weeks. When next examined, there was marked edema over the left frontal sinus and chemosis of the conjunctiva. The eye grounds and vision were normal throughout the entire attack. Four days later, the left middle turbinate was resected, and the improved drainage caused a recession of the symptoms. It was found, however, that pressure over the frontal region caused pus to appear in the nose, and a radiogram confirmed the diagnosis of perforation of the sinus wall. The plate taken laterally shows a small bead of granulation tissue extending across the sinus from back to front. This was found at operation to be attached to the dura.

On April 7, a radical Killian operation was done with considerable difficulty, owing to the brawny infiltration of the tissues and extreme thickening of the periosteum. A perforation about 8 mm. in diameter was found in the exterior wall, and a sequestrum of bone representing the posterior wall was lying loose in the sinus. The posterior wall was entirely eroded and the exposed dura was covered with granulations, one of which was pedunculated and has already been referred to. Recovery was complete in about two weeks, although the infiltration of the tissues persisted for several weeks. Two months later the septum was operated upon, and the patient has been free from symptoms up to the present time. At no time were there any abnormal symptoms or physical signs which could be attributed to the eyes or the nervous system. There is no deformity aside from a slight depression over the sinus, and the scar is inconspicuous. The nasal secretion is normal in amount and character.

DISCUSSION.

DR. FORBES told of a case with extensive perforation, found at operation, and regretted that he had not been able to make the diagnosis before operation as Dr. Leshure had.

DR. COFFIN congratulated Dr. Leshure on his excellent results, saying: "I have frequently seen perforations of either the anterior or posterior walls of the frontal sinus and have often wondered what determines the breaking down of that particular wall involved. This, I think, is the first case that I have seen where both walls were perforated, though I think others have been reported."

DR. HURD told of a somewhat similar case which, however, was started by trauma. A young girl had had a fall about the first of September,

and had never had any nasal trouble before. He saw her the next or fifth day with a large orbital abscess, etc. The sinus was opened up, the anterior wall removed and the ethmoidal wall found to be gone, the frontal wall was soft and mushy. The wound was drained and the patient got on fairly well, but the swelling did not go down. The bridge sank in, and several weeks later he again operated to remove what he thought would be the dead bridge, and found the whole frontal and ethmoidal, inner bony walls were gone. Sequestra after sequestra were removed together with a mass of granulation. The whole thing happened out of a clear sky. It was a fulminating osteitis.

Dr. Hurd said he could not accept the reading of the plate as granulation tissue.

DR. COFFIN said that there was a point that someone ought to make here. This case should be a sufficient answer to our good friends who decry any radical work, and frown on taking off the frontal wall, etc. It must make such men feel very foolish to see such a case as this.

DR. LEWALD agreed that the sequestrum could be made out in the radiograph and stated that dead bone could be distinguished from living bone by the fact that it often retained its original density and appeared to be more dense than the surrounding newly formed bone. This distinction had been made by Dr. D. B. Phemister of Chicago. Dr. LeWald also called attention to the use of a new position in studying the sphenoidal sinuses by means of the Granger angle and stated that Dr. Amedee Granger of New Orleans uses it routinely and considers it superior to the lateral position. Dr. LeWald, however, stated that in his opinion a lateral exposure should be taken in every case because of the possibility of a lack of knowledge of the entire skull which might lead to a misinterpretation.

DR. LESHURE took issue with Dr. Hurd in regard to the granulation tissue, as that diagnosis was confirmed; at operation this little bud was found lying near the anterior wall of the sinus; no further attempt was made to curette. The affection was a rather fulminating one. The patient had had a severe attack of scarlatina and no doubt had considerable breaking down of the bone.

A. Sarcoma of Tonsil; B. Osteoma Involving Nasal Cavity, Antrum, Ethmoid, and Orbit; C. Mucocele of Frontal Sinus. Dr. Lewis Coffin.

(To appear in subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. MAYER felt confident that the patient's present complaints were entirely due to the radium reaction, and told of a case he had treated of inoperable sarcoma of the upper jaw in which the application of radium was followed by really atrocious pain which lasted for some weeks. The patient was told that it could be relieved by morphin if he could not stand it, but that if he would fight it it would take care of itself, as it eventually did.

DR. GUTTMAN told of two cases of inoperable sarcoma of the tonsil which he had referred to the Memorial Hospital for radium treatment; the first patient died after six months, and the other patient had died after four months. As he understood the case, it had been four months since this patient was operated upon. So far as he knew, the longest time reported was two years, the average time being six months that the patient lived after a diagnosis of sarcoma of the tonsil. It seemed to him, that the enlarged gland in the neck is metastasis, and that the case will terminate fatally in a short time.

DR. LORE told of a case which had been examined by several men and a tentative diagnosis of lympho-sarcoma made, and the question of treatment was under discussion; the consensus of opinion being that the patient should be radiated after operation rather than to radiate before the operation.

DR. HURD had seen one case in six months, no radium being used, in which the tonsil and cervical glands were removed but it recurred within.

DR. COFFIN said that Dr. Mayer had expressed his hopes, and Dr. Guttman his fears, and that he could only now await results.

In answer to the question as to whether or not radiation should be done previous to operation, Dr. Coffin said that in this particular case he had discussed the matter with Dr. Robinson, and had decided to operate first because of the length of time one would have to wait for the subsidence of the reaction from radium; others might feel like radiumizing and operating before reaction should set in. As to which is the better, Dr. Coffin said he did not know.

Dr. Coffin disclaimed credit for the idea that mucocele were caused by the joint action of osteoblasts and osteoclasts. The subject had been discussed by Dr. Logan Turner, and he thought also by Dr. Jonathan Wright. The question of the relationship between the mucocele and the osteoma may have been raised by him.

DR. HURD said he had seen Dr. Guntzer's case, to which Dr. Coffin had referred, and remembered helping to operate on it. It occupied the ethmoid region and was almost as smooth as an egg. It had no attachment. Dr. Guntzer laid the check back and exposed this osteoma. The osteoma could not be delivered on account of the bony orbit, and he suggested that it be delivered and let the orbit break.

His conception of the matter was that these were stray bone cells that started to grow. He had seen two similar cases and in neither was there any attachment; they were much smoother on the surface than this specimen Dr. Coffin's suggestion, helped some.

In a case that he had operated upon in the spring, the patient's history went back quite a while; when sixteen years old he had a fulminating frontal sinus which Dr. Hurd had opened up, it being one of the first Killian operations that he had performed. Some years later, when at Princeton, the young man came in again with a fulminating infection in the other frontal, and the sinus was drained as in the former instance, with a good cosmetic result. That was now eight or nine years ago. In the last three or four years the patient had some trouble between where the sinuses were opened up; he was not able to make a diagnosis, but went in and found five distinct sacs of mucocele; they pushed the brain plate back—the anterior wall did not come out. The eyeball was pushed forward and outward.

DR. JOSEPHSON asked about the ocular and local symptoms found in the cases of mucocele of the frontal sinus presented, and mentioned, with a view to ascertaining whether any definite type of ocular disturbance was associated with pressure in the frontal sinus due to damming up of secretions. He told of a patient under his observation. The patient originally presented himself with a pansinusitis and a right optic neuritis secondary to involvement of the sphenoid sinus. The right optic neuritis cleared up promptly after the sinuses were opened and drained. A radical operation was performed on all of the sinuses, which in the case of the left frontal sinus required the removal of the greater part of the floor of the sinus (i. e., the roof of the orbit). After disappearing from observation for a period of one year, the patient returned, suffering with a left-sided optic neuritis, detachment of the retina, and symptoms of pressure within the left frontal sinus. It was found that the sinuses had been permitted to close by granulation and were not draining. Ophthalmologic examination showed that the upper half of the optic nerve (the disc) was more markedly involved than the lower half. The ostia of the sinuses were freed of granulations and drainage re-established. In the case of the left frontal sinus, however, drainage did relieve the pressure symptoms. An X-ray disclosed that sinus was filled with secretion dammed up by a mass of tissue, presumably polyps, placed midway across the sinus. It was consequently assumed that the pressure symptoms complained of by the patient, i. e., a feeling of inability to keep the left eye open because of pressure from above, and dysesthesia over the frontal bone characterized as a sensation of something plastered over that side of the forehead (the latter symptoms are attributed to pressure on the supra-orbital nerve),

are due to secretions retained under high pressure within the frontal sinus, a condition analogous to that presented in the case of mucocele. He was interested in ascertaining the exact nature of the intra-ocular conditions mentioned by Dr. Coffin for the object of determining with what frequency increase of intra-frontal tension was associated with detachment of the retina, what, if any, might be the relation between the two, and what prognosis might be made. He was especially interested because in this case, all of the consultants and himself hesitated about opening into the sinus both because of the optic and the general condition of the patient.

DR. COFFIN said that he was not certain that he understood Dr. Josephson's question but he would say that he could not see how pressure in the frontal sinus or any of the accessory sinuses of the nose could be in any way a causitive factor in detachment of the retina. There might be an underlying diseased relationship.

Prolonged Hemorrhage with Normal Coagulation and Bleeding Time. (Report of Case.) Dr. J. G. Callison.

Published in the May, 1924 issue.

DISCUSSION.

DR. HURD said he had reported a similar case in 1914.

DR. GLUSHAK did not see why it was not considered a case of hemophilia since the patient had hemorrhages when a boy at circumcision, and upon extraction of teeth. He then asked how one could determine by sight whether or not the tissues in the tonsillar fossa contracted so as to close up the bleeding results; he had been unable to see any muscle contraction, though we know muscle fibres will contract, and thereby seal up open blood vessels. The chief factor in this case seemed to be the great loss of blood platelets the reason for which is difficult to understand. The coagulation was normal outside the vessels and was soon washed away by the serum which separated away; but this, however, did not affect the sealing of the vessels which must have been due to great loss of blood platelets.

DR. HURD said that it was not a case of hemophilia, but, as Dr. Callison had said, a case devoid of the tissue juices which held the clot in position on the wound; just what those tissue juices were, he was not prepared to say. He had been working for some years on fat liquids but fortunately had had no case to use it on.

DR. MCDONALD told of a somewhat similar case seen years ago at the N. Y. Polyclinic. After every other means had been exhausted he suggested trying repeated small doses of iodide of sodium. He was laughed at, but tried it, and began to get better results; then he suggested that instead of one to two grains of lactate of calcium they should try 20 grains every hour, and the patient was saved. Later while travelling in the upper portion of Canada, he received a wire from the boy's family saying that he was in one of the hospitals of the city, and asking what could be done. Some one had operated on his nose and he was again bleeding, and they wanted to know what to do.

That case had been a lesson to him, and he now feels strongly that every tonsillar case that has to be operated upon should first be thoroughly tested as to the blood clotting time, the family history, etc. These cases are not very frequent, but when you have once had to watch one for fifteen or eighteen hours with a relay of assistants to help, you will never forget it.

DR. CALLISON, closing the discussion, said he could not think this was a case of hemophilia for he had studied it very carefully, and there were three points, any one of which would practically rule out that diagnosis: the total absence of any family history of bleeding, the low platelet count, and the normal coagulation time. As to the contraction of tissue around the fossa, he thought that any one who had done tonsil operations had seen the tonsillar fossa obliterated in ten days, and all gone in six months. In this case, at the end of the ninth day,

the tonsillar fossa was larger than when first operated upon. He agreed with Dr. Hurd that it was a case in which the tissue reaction was at fault, not the blood. In all the tests, the coagulation time was normal; and the man did not spit out free blood, but blood clots; as soon as the blood was exposed to the air it would coagulate; every time you thought the bleeding was controlled it would start up again before you were out of the building. The mass coagulation test on taking blood for a Wassermann reaction showed a much shorter time than the ordinary blood specimens. It was certainly the tissue reaction that was at fault.

Laryngeal Paralysis. Dr. D. H. Jones.

Boy, 7 years old, came to the Manhattan Eye, Ear and Throat Hotspital on the service of Dr. Coffin, on Nov. 7, 1923, with history of difficult breathing, hoarseness, inability to sleep when lying down, this condition has been going on for three or four weeks.

F.H., negative, no brothers or sisters.

P.H., measles, mumps, no diphtheria, pertussis last year, no other illness, adenoids and tonsils removed three months ago.

Onset four weeks ago, mother noticed that child was very restless at night and difficulty in sleeping lying down, breathed rapidly while walking around, some hoarseness, appetite good, lost two or three pounds since A and T operation, no history of pain seems to have been difficulty in swallowing, although able to eat solid food, no history of bleeding or adenitis.

Physical examination shows a thin, anaemic, under-nourished, emaciated child, with rather a prominent sternum and child holds himself rigid as if spine was fixed and head rotated to the left and tilted to the left an attempt to tilt head to the right caused child to cry. No enlargement of glands and no rachitis.

Report of attending physician, Dr. Stowell: Heart displaced toward the right, dullness along right border of sternum about one inch, not much evidence posteriorally, no murmur or bruit.

Lungs show evidence of possible consolidation in right upper lobe, few scattered rales. Abdomen negative.

Throat culture negative, sputum shows streptococcus mitis, staph. and micro catarrahalis, no tubercle bacilli. Von Pirquet 21-hour test, positive moderate reaction. Wassermann negative.

Owing to the child being easily excited, it was impossible to make an indirect laryngeal examination and the child was transferred to the service of Dr. Imperatori for direct laryngoscopy, the dyspnoea being so marked that all preparation was made for a tracheotomy. Direct examination, no anesthesia. Jackson child laryngoscope shows no abduction, and a very slight adduction right cord, limited abduction and adduction left cord anterior 2/3. No evidence of tumor or mass.

Temperature the highest while in the hospital was 100. Kept in bed for four or five days for observation; hoarseness and dyspnoea disappeared.

X-Ray Examination: Flourscopic examination shows no evidence of aneurysm, no pulsation of tumor mass, heart displaced to right. Plate shows large rounded tumor on anterior surface of spine from third to tenth dorsal vertebra and there is absorption of body of fifth dorsal vertebra.

Dr. Forbes told of a similar case in which the result was very disastrous; the caries was high up and they were not able to diagnose it by direct or indirect bronchoscopic examination nor by the X-ray, and the patient died. Dr. Jones was to be congratulated on making the diagnosis.

The Attitude of Physicians in Reporting Accidental Poisoning. (Paper). Dr. Emil Mayer.

Summary: Dr. Mayer said that his experience during the last four years as Chairman of Committees on toxicities following local anesthesia showed conclusively that the large majority of deaths were not recorded.

As fully 50 per cent of those collected by his Committees occurred in nose and throat practice, he felt that the subject of his paper was entirely fitting for presentation in the nose and throat section of the Academy. He stated that his paper was a plea for greater publicity which would permit statistical studies and also be the means of saving life by calling attention to the fact that fatalities may occur.

The speaker then spoke briefly on the two reports published by his former Committee and that the investigation had been limited to laryngologists. His present Committee under the auspices of the Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the American Medical Association. This Committee had sent out four thousand questionnaires to physicians and dentists to ascertain what fatalities had occurred during a limited time.

Forty-three deaths were thus reported and these carefully tabulated by the Chairman. A digest of all information received was made including twenty necropsies with thirteen protocols in full: Animal experimentation was made to determine three different postulates. Members of the Committee had been permitted to present abstracts of their own reports to special organizations receiving in return much valuable information. All these formed the basis of discussion at the meeting of the Committee to consider this subject.

The report of the Committee contained not only the reply to the original plan but also recommendations as to what doses of the various anesthetics used they deemed to be safest. This report has now been sent to Professor Sollmann, Chairman of the Therapeutic Retearch Committee and will presumably be published.

Owing to the need for conciseness everything that did not belong strictly to the scientific aims of the investigation had to be omitted. Hence, there was no reference to the reaction of the Committee in receiving accounts of fatalities nor to the hesitating and often absolute refusal to co operate on the part of the physician who had the fatality. The speaker mentioned two instances of the latter. In one the speaker admitted a death under cocain in the urethra but could not remember the slightest detail, not even the dose. The Committee was informed that the physician has had no other attacks of lack of memory. In the other instance a drug recently introduced was followed by fatal result in a young man on whom a tonsil operation was intended. The death is said to have occurred in the doctor's office, but the latter has been apparently deaf to all entreaties to state the facts as they occurred. On the other hand the speaker mentioned the splendid courage shown and valuable assistance given by another physician in reporting two fatalities from the same drug.

Dr. Mayer said that while certain deaths were recorded as being due to the local anesthetic because they were so reported by the physician, he was confident that a careful analysis would show here and there at least that death was due to some other cause. He also called attention to cases recorded as deaths of an accidental nature such as a series of cases of fatalities said to be due to epsom salt could be shown to have been due to other causes. Thus also in four other cited cases of accidental poisoning that were distinctly not due to the drug implicated.

From an experience of a four years' study of one form of accidental poisoning the speaker felt that with a better knowledge of the need for recording every case many more would be published. Our knowledge of what constitutes an accidental death would be broadened, the preventable ones would not occur, restoratives would be intelligently applied and there would be a saving of human life.

Dr. Coffin expressed his own appreciation, and he felt sure that it was shared by the members of the Section, of the very laborious and valuable work which the committee had done, and which had been so well presented by Dr. Mayer.

Dr. Alfred Kahn asked if Dr. Mayer and the other members of the Committee felt able to express an opinion as to what was the safest anesthetic.

DR. MCDONALD wished to know as to the relative toxicity of Butyn. He had been informed that Butyn was two and one-half times as toxic and would like to have information on this subject.

DR. RODMAN said that in the Hajek Clinic they claim they have never had a case of cocain poisoning, and that their good results are due to using one part of 20 per cent cocain to 3 parts of 1/1000 adrenalin making a solution of only 5 per cent cocain with adrenalin. They use this in bronchoscopic as well as in nose work.

DR. J. J. KING said he wished to express his appreciation of Dr. Mayer's great work. He had been closely associated with Dr. Mayer and he felt that the medical profession was greatly indebted to Dr. Mayer for the labor expended in classifying the toxicity of the various anesthetics and in collecting and reporting the deaths. It is the finest work that has been done on the subject, and as time goes on it will be more and more appreciated by the profession.

DR. GLUSHAK, referring to the question of novocain poisoning, said that in visiting the various hospitals and clinics one sees a variety of local anesthetics used, and in one clinic in Berlin, had noticed that novocain was being used to a considerable extent, so that the assistants would say: "Shoot in all the novocain you want; it is not a question of quantity!"—and on being interrogated upon the subject, they told of an incident in the war when a hypodermoclysis of salt solution was ordered, and a male nurse by mistake used a one per cent solution of novocain to the same extent—and the patient was not in the slightest affected. It was a fact that at that clinic they did not fear the use of large quantities of novocain, and used it just like water, though they were very careful about using adrenalin. And yet, one hears of deaths from a small amount of novocain. Are those deaths true cocain poisonings? The speaker doubts it.

DR. HURD said that this Committee was doing the greatest work for laryngology that has been done in years, and it ought to have better support from the profession. He then said that he knew of two tonsillar deaths that had occurred and that he had urged both physicians to report the facts to Dr. Mayer, but that so far as he knew they had not done so.

DR. J. J. KING then presented the following motion: That this Section on Laryngology is deeply appreciative of the importance of the subject of local anesthesia, and of the splendid work that the paper just read presages.

He further moved that the thanks of the Section be extended to Dr. Mayer and his associates, and that this endorsement and the thanks of the Section be placed upon the minutes.

Motion was seconded by Dr. L. M. Hurd.

Unanimously carried.

DR. MAYER, closing the discussion, said that his Committee states that procain is the safest of the local anesthetics now in general use, though it is not without danger. If given slowly and a vein is not entered quite a quantity can be used, especially where there is a large field to cover as in an external surgical operation.

Dr. Rodman's statement that a 5 per cent solution of cocain and a 75 per cent solution of adrenalin is safely used in bronchoscopy is of interest. The dose of adrenalin is unnecessarily large. While the bronchus is more tolerant to local anesthetics than other parts, this practice would naturally lead to the use of this same strength elsewhere with assuredly fatal results. The speaker knew of two deaths that had occurred in using similar strengths in other parts of the body than the bronchus.

Replying to Dr. McDonald's question, Dr. Mayer said that he believed butyn to be about as toxic as cocain. He had no evidence of it being greater. There was this to be said regarding butyn: It is claimed that butyn will abolish reflexes just as cocain does, and if so it will be of value even if as toxic as cocain, for we must bear in mind the strong

prejudice there is against cocain because of its being a habit-forming drug.

One other thing was the general tendency to overdosing. One man writes that he has been injecting a two per cent solution of butyn, the manufacturer's advise only one, and the writer states that several of his patients had convulsions and he wondered why.

Finally, a study of fatal cases reported shows that other causes than those stated by the physician were factors in producing death and the speaker believed that much good would come of reporting fatalities and a closer study of the entire subject.

D. Mayer paid a warm tribute to his associates on the Committees during the past four years and said that he felt that much had been accomplished in showing that there were many more deaths than were recorded, in giving a clear definition of what constitutes a fatality from local anesthesia, in reporting the first cases of deaths from butyn and in the recommendations which were made in the forthcoming report of this Committee that would, he hoped, make this important agent of more value and be the means of saving human life.

Self-Retaining Direct Laryngoscope. Dr. Rodman.

(To appear in subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. GLUSHAK said he had had many opportunities of working with Dr. Rodman, and the only thing near this instrument was the Direct Laryngoscope by Seifert of Berlin, which is a modification of the Killian Suspension Laryngoscope, and does not come up to this one, which is easily applied and is a great advance over the other instruments for the same purpose.

This instrument is known as the Hasslinger Directoscope, an invention of Dr. Hasslinger of Dr. Hajek's Clinic of Vienna.

It consists of two blades, one called the tongue spatula which depresses the tongue and draws the epiglottis with the tongue forwards, and the other the pharyngeal to which is attached a plate which passes behind the arytenoid into the hypopharynx, with the hypopharynx and the underlying vertebra used as a fixed point from which counterpressure is produced to advance the tongue and epiglottis forward thus exposing the larynax.

Introduction of the instrument for examination of the patient in the sitting posture: The instrument is introduced closed, the plate for the hypopharynx is completely drawn back, the examiners right hand holding the handle. The instrument is then advanced along the patient's protruded tongue over the epiglottis until the examiner sees the posterior wall of the larynx, viz., the arytenoid cartilage. Then with the thumb of the left hand and without force you press the head of the advancing rod to the entire limit by means of which the hypopharynx plate is placed in the proper position. Then with the fingers of the left hand turn the wing screw until the larynx is brought to the desired exposure. In this position the instrument becomes automatically fixed and you can proceed with the necessary operative procedures.

Withdrawal: Right hand fastens the grip, left hand reverses the screw ocmpletely and the instrument is withdrawn. It is unnecessary to draw back the hypopharynx plate.

The advantages of this instrument are that it is far less cumbersome than the Killian Suspension Apparatus that it produces less trauma, and what is of greatest import is that you can use this instrument in the sitting posture as well as in the prone, so that you may treat and operate your patient in the office and allow him to go home in a short time.

DR. MYERSON said that he did not think that with this instrument one could attack the anterior commissure as well as with the suspension apparatus, though all instruments of this type are an adjunct in diagnosis where one does not have to get a perfect exposure of the larynx;

but for a true exposure of the larynx he did not think such an instrument such an instrument would serve. Such instruments will not take the place of the suspension apparatus; they will serve us in cases that are specially adapted for this use. Also it seemed that one might get quite an ulceration with that in place for any length of time.

DR. UNGER told of a similar instrument, a description of which he had published in THE LARYNGOSCOPE in 1914; he had since discarded the long blade that pressed against the vertebral column, because some patients had an enormous pharynx and it seemed impossible to reach the back of it with it, so he had substituted a small blade which rested against the palate.

DISCUSSION.

DR. RODMAN said, in answer to the argument that this instrument would not be so practical in a large pharynx, that on the contrary it would be an advantage; also, that it did not stay in place long enough to produce traumatism from pressure and in that regard was superior to the unwieldy Killian Suspension Apparatus, and that another advantage was that this instrument can be employed in the sitting as well as in the prone position.

SECTION ON OTOLOGY.

January 4, 1924.

"The Present Status of Middle Ear Conditions from a Pathological and Clinical Standpoint." Dr. James G. Dwyer.

"The Treatment of Deafness. Critical Review of Current Theories and Methods. Suggested Modifications, More Logically Based on the Problems Involved." Dr. Philip D. Kerrison.

DISCUSSION.

Dr. Kerrison's discussion was divided roughly into two parts: (1) A brief review of current theories of local treatment; and (2) Suggested modifications of the usual routine.

Leaving quite out of consideration all cases of deafness due primarily to acoustic nerve or labyrinthine defects or lesions, the current theories of local treatment are based for the most part on one or other of two time-honored hypotheses as to the mechanics of tympanic deafness:

(a) *That of the occluded tube.* It is assumed that this condition, causing retraction of the drum membrane and congestion of the tympanic mucosa, is in large measure responsible for the deafness present. That in advanced or long standing deafness the tubal disease has ceased to be more than a relatively unimportant factor in the mechanics of sound obstruction, is proved by the fact that restoration of the tube to normal patency or condition never brings a return of even approximately normal hearing.

(b) That the drum membrane has become thickened, rigid or in some way less mobile than in the normal ear, and therefore does not respond as normally to sound waves. Dr. Kerrison believed this to be an unfortunate popular misapprehension which in the past had interfered considerably with clear thinking and led to some irrational methods of treatment.

There is of course a third and major factor in the pathology of obstructive deafness, i. e., ankylosis or rigidity of the ossicular joints, and particularly, as in otosclerosis, fixation of the stapes within the oval window. Such changes, however, are so clearly beyond correction by any of the measures in common use as to have little or no bearing on their value.

The discussion of local treatment was based largely on the proposition that *relaxation of the drumhead*, and not rigidity, is the commonest pathologic change, at least so far as the membrane itself is concerned, in chronic obstructive deafness. In support of this view, the following

facts and considerations were adduced: (a) That, barring the purest types of otosclerosis, retraction of the drumhead is present in some degree in the vast majority of cases of tympanic deafness; and that this retraction was not a temporary condition, but usually of long standing. (b) That it was impossible to believe that a comparatively rigid and inelastic membrane can be stretched into an abnormal position and there retained over a period of months or years without undergoing some degree of structural change,—i. e., relaxation. (c) If such relaxation did not exist, the drum membrane, when released by inflation or cocainization of the tube, would spring back into a perfectly normal position; and that such complete correction of position did not as a rule take place. If, therefore, from a consideration of these more or less obvious and accepted facts, we conceive of prolonged retraction and relaxation as being in a sense equivalent terms, we need seek no further proof that a relaxed membrana tensa is a common factor in the mechanics of sound obstruction.

The term "relaxed membrane", is defined as referring not only to the exaggerated forms of extreme atrophy familiar to all of us, but also to the far more numerous but less conspicuous forms in which the membrane suffers a loss of tonicity not easily measured by inspection, but which counts nevertheless as a potent factor in the retrograde processes leading to deafness.

The influence of drumhead relaxation as a possible starting point in a vicious circle of patholigic events leading to deafness is discussed at some length, and the following stages described: (1) *Impaired sound transmission through drumhead relaxation*, it being clear that sound waves must first "take up the slack" of a relaxed membrane before becoming operative upon the ossicular chain. It is also clear that as relaxation becomes greater, the influence of sound waves upon the ossicular chain is proportionately reduced. Therefore, (2) *Gradual loss of ossicular mobility through relative ossicular disuse.* It is obvious that as drumhead relaxation and loss of ossicular mobility progress, the sound impressions reaching the cochlear mechanism must become progressively and proportionately weaker. Therefore, (3) *Slowly progressive acoustic nerve torpor through gradual cutting off of normal sonorous stimuli.*

The discussion of current theories of local treatment dealt chiefly with the irrationality of any scheme of treatment in which routine catheter inflation plays a prominent part. A distinction was drawn between the immediate and the ultimate results of inflation,—the first few inflations usually resulting in improved hearing, whereas the ultimate results of routine inflation were almost inevitably a further disturbance of tension with more or less serious loss of hearing.

The notes on the practical treatment of deafness were based largely on Dr. Kerrison's personal experience with measures in common use. They may be summarized somewhat as follows:

Inflation: A few inflations at short intervals are advocated at the beginning of treatment, the results being gauged by rapid hearing tests before and after each inflation. The purpose of these frequent tests is to determine any progressive gain which may result. As soon as it is demonstrated that the maximum result has been reached, inflation as a routine measure should be discontinued. This statement is based on his experience that from this point more can be accomplished in the direction of betterment of hearing by judicious local treatment of the nasopharynx and Eustachian tubes than by repeated inflations, and that the drum membranes are thereby relieved of a strain which is likely to cause further anomalies of tension and ultimately work quite serious injury to hearing.

Eustachian canals: With reference to treatment of the tubes, two points are emphasized: (1) That catheter inflation *per se* exerts no influence of permanent therapeutic value upon a chronically congested canal; and (2) That the frequent use of Eustachian sounds or bougies does not aid in restoring a diseased tube to a normal condition. On the contrary, with allowance for exceptional cases of actual localized constrictions or

adhesions, the frequent passage of even a small bougie through and beyond the isthmus may aggravate a tubal lesion and do positive harm.

Chief reliance in the effort to restore tubal function is placed upon (a) application of appropriate drugs, and (b) this failing, on direct surgical measures for the reduction of chronic congestion, edema or hypertrophy at the pharyngeal end of the canal.

Of a choice of drugs little is said, this being so much a matter of common knowledge. Much greater importance is attached to the method of their application. It is hardly open to question that tubal disease begins usually or always in the pharyngeal end of the canal. Just as cocain or adrenalin, applied to this portion, usually clears the whole canal. so astringents or other corrective drugs, confined to this region, usually exert their influence throughout the entire canal. A larger percentage of tangible results is obtained from drugs confined to this restricted field than can be obtained from the same drugs applied by sounds or applicators throughout the entire canal.

Aside from their convenience in cleansing the nasal passages, no therapeutic value is accorded to nasal or naso-pharyngeal sprays. On the other hand, periodic irrigation of the naso-pharynx with a warm solution of normal salt or other non-irritant solution is of positive value in relieving naso-pharyngeal and tubal congestion. Occasional irrigation with a 2 per cent solution of argyrol helps to relieve tubal congestion in a very considerable proportion of cases.

Naturally there are cases in which the results of the simple treatment outlined above are disappointing. While the naso-pharyngeal condition may be distinctly better, there may be no evidence of any improvement in tubal function.

Direct inspection of the tubal region with a Holmes-Wappler pharyngoscope will throw light on certain cases of obstinate tubal insufficiency. One may find, for example, a degree of congestion, edema or hypertrophy at the mouth of the tube fully accounting for failure of tubal function. It is in the presence of such a condition that incision through the congested or edematous portion may, through withdrawal of blood or subsequent tissue contraction, bring about restoration or at least improvement of tubal function.

Dr. Kerrison exhibited a probe and two knives especially designed for use in this field, with brief notes as to their use. When the nasal passage and tubal mouth have been cocainized, the knife is passed catheter fashion through the nose and introduced by slight pressure into the tube. If sharp, a clean incision can be made as the knife is withdrawn. Rather free bleeding usually follows. which, however, ordinarily ceases in one to two minutes.

This procedure can be of use only in carefully selected cases. It is mentioned as supplying a useful link in the chain of treatment measures for certain cases in which an obstructive condition, definitely localized at the pharyngeal mouth of the tube, blocks the way to results.

The drum membrane. The point is made that even after tubal function has been re-established, the drum membrane may, and quite frequently does, continue to occupy a somewhat retracted position. This is attributed, not to negative air pressure within the tympanum, but to the structural habit or set of the membrane after years of tubal insufficiency or obstruction. In other words, the membrane, like any fabric long inured to one position, tends when left without support to lapse into the habitual but abnormal position,—in this case, that of retraction.

To overcome or correct habit retraction is obviously a difficult problem. The only theoretically rational effort would be to retain the membrana tensa by any available means in a relatively normal position, thereby giving nature a chance to restore normal tone. Dr. Kerrison advocates the use of paper splints as an available means to this end. A paper disc, cut to conform to the most relaxed or atrophied portion, soaked in alcohol and applied to the membrane immediately after inflation, will hold its position for weeks or months. The purpose of this

splint is not the immediate effect on hearing (which may or may not be improved), but to re-establish normal position and ultimately normal tone or tension.

The steps so far outlined, if successfully carried out, should have the following results: (1) A better functionating tube; (2) a more normally placed drum membrane; and (3) a more normal balance between drum membrane and ossicular chain. These changes should be translated functionally into better hearing.

The next step is referred to as "the most difficult problem in local treatment", i. e., *how without injury to the drum membrane to exercise or re-educate the ossicular chain to more effective transmission of sound waves.*

Utilization of sound waves. Dr. Kerrison described his use of selected sound waves from a specially designed set of large tuning forks for exercising the conducting mechanism in obstructive deafness. It is known, of course, that sound impressions reach the inner ear chiefly through vibrations of the conducting mechanism excited by sound waves from without; and that in obstructive deafness loss of tone perception (or rather failure of sound transmission) begins at, and extends from, the lower end of the musical scale. The use of tuning forks is simply a utilization of selected sound waves of low pitch but relatively great intensity to exercise the ossicles in just those movements (sounds) for which their mobility is known to be impaired. If, for example, it be shown by careful tests with small forks that the hearing is all but lost for a given tone, e. g., 160 double vibrations, why is it not a logical procedure to exercise the conducting mechanism for that particular note by means of larger forks of the same and of lower pitch whose greater amplitude of vibration is sufficient to throw the drum membrane into more vigorous vibrations? In the case cited, the forks chosen would represent 160. 144, 128, 120, 107 double vibrations, respectively. First the highest fork, 160 d. v., is set in maximum vibration and held with flat surface close to the ear until its tone is no longer heard. Then the next lower fork, 144 d. v., is used in the same manner, and so on through the series of successively lower forks until one is reached which is not appreciated as sound. In this way, forks four or five tones lower will usually be heard.

The Acoustic Nerve. There is reason to believe that in every case of progressive or advancing deafness of whatever pathological type there is developed sooner or later a non-tympanic factor in the condition of the acoustic nerve itself which, no longer receiving its normal stimuli in normal force, undergoes a sort of functional retrogression or torpor. Such an hypothesis, at least, seems necessary to explain the functional status in the later stages even of cases apparently beginning as purely tympanic lesions, when a degree and type of deafness is reached which can hardly be accounted for except by the assumption of auditory nerve involvement. If we accept this hypothesis, it becomes obvious that the nerve, as well as the conducting mechanism, must be considered in all of advanced deafness.

The treatment of the acoustic nerve can be considered if at all, only from the following viewpoints: (1) The possibility of local, or direct, stimulation; (2) administration of drugs; (3) elimination of injurious agencies; and (4) hygiene, or regulation of the patient's mode of existence.

Under direct stimulation, Dr. Kerrison spoke again of tonal stimulation, i. e., the tuning fork exercises already described. For the purpose of more directly influencing the acoustic nerve, these exercises may with advantage be varied by using bone conduction instead of air conduction. Through this medium, tones several octaves lower than can be heard by air conduction will usually be appreciated without difficulty; and with large forks placed against the mastoid or lightly against the tragus, there is a very appreciable sense of percussion or mass movement in addition to that of tone perception. What more logical or physiologically rational form of nerve stimulation can be imagined in a case of advanced deafness than one which will force the acoustic nerve for very brief

periods to respond to tonal stimuli two or more octaves below those commonly reaching it through the disabled conducting apparatus?

With regard to other possibilities in the management of the nervous element in deafness: the elimination of tobacco and alcohol, the search for and elimination of foci of infection wherever located, and the regulation of the patient's existence on more hygienic lines have been mentioned so much as a routine matter in connection with all forms of disease as almost to have ceased to register in the mind of the average reader. It would seem, however, that all these agencies might possess for us a more definite value and significance in relation to deafness if considered solely with reference to their possible influence upon the acoustic nerve.

Extra-aural foci of infection. Of first importance in the treatment of deafness is an exhaustive search for foci of infection from which the ear may suffer indirectly. Of these the most frequent and important are: infected tonsils, dental root infections, chronic infections of the nasal sinuses, gastro-intestinal infections. Unfortunately not very much can be expected as a result of the elimination of such a focus in the way of marked improvement in hearing. It cannot be too positively stated, therefore, that whoever advises tonsillectomy, removal of infected teeth, etc., with the expectation of marked functional gain will be likely to find that he has deceived both himself and his patient. On the other hand, a patient constantly or intermittently absorbing septic matter in amounts however small, will naturally respond less favorably to any treatment, local or constitutional. There are, furthermore, authentic case histories in which the eighth nerve has undoubtedly been the point of direct attack by such poisons. On other grounds, therefore, the elimination of such a focus is always a logical and positive indication, which in cases of deafness may help to limit the advance and in certain cases may be followed by some functional gain.

Tobacco. The question of the tobacco habit is not an easy problem in deafness since its influence in any particular case is so problematical Probably the most satisfactory approach to this subject is by a quite frank discussion, explaining to the patient that tobacco is undoubtedly an acoustic nerve poison in certain cases, and that it is impossible to determine to what extent it is operative in his case or to what extent its elimination may help to turn the scale toward functional recovery. On this basis one may enlist an intelligent patient's interest and co-operation in experiments which may prove to his very great advantage.

Hygiene: Regular hours, plenty of sleep, exercise in the open air, simple wholesome diet, elimination of all that goes by the name of dissipation, freed from brain fag or strain. Impossible of realization as all this may seem in a city environment, we have here all the elements out of which to construct a compromise scheme of existence which would help a large majority of these patients.

To summarize: whatever increases general vitality or vigor tends to improve audition; and whatever hearing gain accrues from such means must be attributed to a better functionating nerve rather than to improved sound transmission.

Only as we take into consideration all the factors in the production of deafness and all the potentialities of treatment logically applicable to their correction, shall we obtain for the average patient a hearing gain of permanence or value.

DR. D. HAROLD WALKER (Boston), expressed his appreciation of being invited to discuss these papers. Dr. Kerrison has spoken of the time-honored method of inflating the tube and of his disbelief in this form of treatment. Dr. Blake, whose assistant Dr. Walker had been for some years, had expressed to him in a heart to heart talk that the current method of treating these patients amounted to very little. The patient wanted something done and the ears were inflated. He believed that the encouragement and general advice given did more for the patient than the aural treatment.

Dr. Kerrison had also spoken of the use of splints with relaxed membranes. "The proof of the pudding is in the eating," and Dr. Walker had reported one of these cases two years ago. The patient was a well-known oculist of St. Louis who came to Boston suffering from vertigo, tinnitus, etc. He had been treated by a very good man, his ethmoids removed, antra opened, etc., but he was becoming deafer. A paper disc was applied and immediately he asked, "What have you done? I feel all right." He was told that a paper splint had been put in and he went home relieved. A year later he wrote saying that his tinnitus had disappeared and his hearing had improved. This improvement was simply due to the fact that the constantly stretched drum had betn given a chance to contract normally. Dr. Kerrison's theory was a very important one, for a great deal can be done by lessening the relaxation by splints.

Dr. Dwyer had spoken of the good results obtained by removing the tonsils. Dr. Walker said that he had not been so fortunate. Of course, common sense demanded the removal of any foci of infection and when the tonsils are really diseased they should be removed on general principles but as for actual relief by this means, he had not been able to obtain it. Recently, Dr. Walker had talked with two of his colleagues who had spoken of operating on the tonsils for deafness. The patients improved at first and then the hearing decreased again. In place of the tonsils there would develop a large lateral gland that seemed to do more harm than the tonsils. An effort is being made to decrease these glands by the use of X-ray and radium but the results are not promising.

Dr. Kerrison had also spoken of the use of bougies; that in the long run they may do more harm than good. He stated that there was a certain class of patients who might be helped by means of inflation. There is no question that a certain number of cases where the arthritic changes in the middle ear are not marked that treatment by means of inflation seems to do good. Usually, however, patients who come to you for treatment are already deaf, adhesions having formed about the stapes and ankylosis of the ossicles begun. In such cases, how is it possible that simply forcing a little air into the middle ear through the Eustachian tube can be of any use? In these cases where the drum membrane has become retracted which he thinks is due to the tensor tympani muscle and in such cases where there is any relief, it is due to a momentary stretching of a relaxed drum membrane, the effect being only a very temporary one. He agrees with him that in such cases inflation does more harm than good. If a Eustachian tube is closed, then the cause of this closure and not the effect should be treated. Dr. Kerrison had also spoken of the nerve changes that accompany deafness. Mannasse showed long ago that there were nerve changes whether due to toxins or to pressure, one could not say. Personally, Dr. Walker stated that he had used the Bougie for some years and in some certain cases of recent deafness they seemed to increase the hearing power. He felt that it was necessary not to use force or in any way to injure the lining membrane of the tube.

It must be remembered that our ears are as old as we are. One cannot always tell these patients that they are getting old but such is the fact and some of these conditions may be pre-senile changes. Dr. Emerson states that some of these cases may be syphilitic or toxic, but has he any way of testing these changes and findings? It is impossible to test bone conduction accurately. We have but the monochord and tuning fork, both of which are affected by the thickness of the periosteum and skin over the mastoid and also by the character of the mastoid itself. Dr. Walker has seen one person suffering from deafness of not very long standing which improved after giving up smoking. In cases of smokers' throat, there is often an occlusion of the tube and these cases improve if you can get the patients to give up smoking. As for the effects of alcohol on deafness, there was no longer need to consider that, at least in Boston.

Dr. Walker regrets the habit of sleeping in excessively cold temperatures and especially with pillows as this predisposes to naso-pharyngeal

congestion which in time may affect the hearing. It has always seemed to him a very foolish habit which has no precedent. All the animals who live in winter climates prefer breathing warm air. Who has seen a dog sleep with his head away from the fire or a bird who did not have its beak buried in its feathers? The turbinal congestion necessary to heat up the cold air results in hypertrophy and eventually lessens the normal breathing space. He also believes that the head always should be maintained higher than the body in order to avoid passive congestion and the patient not be allowed to lie on his back.

DR. LEDERMAN said that, as was well known, there was no royal road to the improvement of these conditions, but that he was somewhat surprised at the rather sad tone in which some of the treatment was spoken of, for when one comes to consider the various methods offered and suggested it was rather astounding that we have not had more remarkable results in the treatment of these very unfortunate persons, although he had himself seen any number of cases that had improved under rather simple measures. One method of local treatment which he has employed for a number of years is the medication of the Eustachian tube —not by Bougies or applicators but by a catheter with oil. It is well known that oil does remain on the mucous surfaces for a long time, and it is also known that one can medicate with oil in such a way as to get therapeutic effects—perhaps not lasting but certainly helpful for a time. In these cases of tubal occlusion he has found beneficial the application of some petroleum oil medicated with either iodine or menthol or camphor, for we know that there is a certain amount of tubal congestion in catarrhal conditions of the upper air passages. It is not necessary to inflate withh 15-pound pressure, for one can get the oil in the Eustachian tube with a pressure of 5 or 10 pounds, and can regulate the pressure as required. If one can get the patient to come twice a week or more, if necessary, for this treatment, certain effects can be secured in strictly tubal conditions.

Nothing has been said about the cases of adhesions often present in the middle ear cavity. These can be helped by pneumatic massage and catheter medication, and in carrying out Dr. Kerrison's idea with tuning forks, or other forms of phonetic massage. An instrument on the market for some years, very much like the telephone receiver, attached to a rheostat and galvano-current, by which one can increase or lower musical tones, and their volume. By keeping this treatment up for a while we do get an effect the same as with the tuning fork; the range of sound can be increased two to three octaves and we know the vibrations reach the perceptive portion of the auditory nerve, as the ear piece is adjusted to the ear in close contact, and the patient informs us of the change in tone and volume.

The treatment of arthritis by baking the joints is well known. Some years ago several cases were reported by a southern observer in which cases of adhesive catarrh were treated by baking the ear. By means of a long sleeve the heat was concentrated into the canal of the ear, and a number of excellent results were said to have been obtained.

Referring to Dr. Walker's remarks about the formation of the pharyngeal fold after the removal of the tonsils, Dr. Lederman said that every one had seen instances of this remarkable reproduction of lymphoid tissue, causing the patient to feel at times worse than before operation. It was not simple to relieve the patient of these enormous hypertrophies that do occur after enucleation, and it was nature's effort to restore glandular activity in this region. One often sees cases where the Eustachian tube and the membrane in good condition is quite free and yet the patient has tinnitus. He then told of a patient whose tinnitus was apparently influenced by circulatory disturbance, etc. Why may not such a case be due to a supercial arrangement of the blood vessels in the middle and internal ear. These circulatory disturbances per se may give rise to certain symptoms that are not due to infective processes.

DR. KERRISON said that Dr. Walker's report of his experience as to the occasional influence of tonsillectomy on deafness was both interesting

and timely. Such cases do occur and, the fact should be known. One of Dr. Kerrison's patients who for years had been suffering from the common type of obstructive deafness, recently made a visit to the Battle Creek Sanitarium. While there a tonsillectomy was performed on this patient, and she came back with a loss of hearing which in degree and suddenness was very unusual in Dr. Kerrison's experience. The relation of cause and effect was difficult to explain but that there was a relation between the operation and the sudden functional loss, one could not easily dismiss.

SECTION ON LARNGOLOGY AND RHINOLOGY.

January 23, 1924.

Osteoma of the Pharynx. (Presentation of Patient Showing Result.)
Dr. Hugh B. Blackwell, New York City.

Patient, Miss C., age 30, was admitted to the New York Eye and Ear Infirmary in April, 1923, with the following history. Some three years previous I had noticed a small, hard nodular enlargement in the mid line of the pharyngeal wall abreast the base of the uvula. This tumor was hard and apparently sprang from the body of the second cervical vertebra. The mucous membrane was movable over the growth which was of a sessile character. This tumor gradually became larger for the next three years until it extended forward touching the base of the uvula and maintaining the same general characteristics.

The patient complained of difficulty on swallowing and regurgitation of fluids through the nose with indefinite shooting pains in the head and neck. At the time of admission to the hospital the patient's weight was 92 pounds.

Operation: Under general anesthesia a vertical incision about an inch and a half long was made in the mucous membrane periosteum in the mid line of the growth: the soft parts were elevated laterally revealing a bony tumor springing from the body of the vertebra, circular in size, about three quarters of an inch in each direction and growing about the same distance into the pharynx. This tumor was removed with gouge, chisel and curetts; it was found to contain some cheesy material which under microscopical examination and culture failed to reveal anything of significance. The mucous membrane was brought together by means of suture.

Twenty-four hours after operation the pharynx became intensely swollen placing such tension upon the wound that the sutures pulled out. Owing to the difficulty in swallowing which became practically impossible, I referred the patient to Dr. Imperatori for further examination and possibly continuous catheter feeding by mouth.

Rectal feeding, however, was only resorted to for a day or two, as it so happened that the swelling in the throat shortly began to subside and the patient was able to swallow at first liquids and in a few days semi-solids.

X-rays were taken of the vertebral region which were negative. The wound in the pharynx remained open for some fifteen weeks before it healed. Several times during convalescence large masses of granulation tissue about the size of the end of a thumb were removed with curved scissors.

The dysphagia gradually subsided, the regurgitation disappeared and the throat has now been completely healed for six months with no symptoms.

The patient's weight is now 116 pounds, as against 92 pounds shortly before the operation, and her health better than for several years. This case was interesting, first from the standpoint of the rarity of its incidence and second as to its cause and exact nature. References to the condition are extremely rare in literature. My own feeling is that the

condition was probably tubercular in origin and entirely local as attested by the absence of tuberculosis elsewhere in the body, and the great improvement in health generally and increase of weight of 16 pounds during the past six months.

DISCUSSION.

DR. HARMON SMITH said he had never seen a tumor of this type in this locality. That it should be held in mind that there was a possibility of its being an osteosarcoma or an osteotuberculoma. He had never heard of an osteotuberculoma but the fact that the center of the tumor was cheesy in character suggested that the origin might have been tuberculous. He saw no reason why in a tuberculous bone condition nature should not throw protective bone elements around the destructive inflammation the same as it throws a protective fibrosis around a tubercle in the lungs. In such case an osteotuberculoma might result.

DR. HARRIS also said he had never seen an osteoma of this character in this locality, but he had a case of osteosarcoma in almost the exact locality described by Dr. Blackwell. The patient, a man a little over forty, came up from the South in an advanced condition of emaciation, with a history of not over a few months' duration. Examination showed a very decided mass in the nasopharynx, interfering very much with respiration and deglutition. The case was entirely negative for syphilis. The picture showed the upper cervical vertebra much eroded anteriorly with loss of bone structure, which was ascribed to the erosion of the disease rather than to disease of the bone. The patient was in the hospital for about a month and finally succumbed to the disease—a tracheotomy having been done in the meantime on account of the extent of the growth. It was inoperable surgically, and radium was applied in the most approved manner. There seemed to be a little improvement, but that was deceptive, for the patient went on to decline and death.

DR. BLACKWELL said the possibility of the growth being a sarcomatous condition was considered. Subsequent to the operation during the process of healing at different times large masses of granulations growing from the wound appeared in the pharynx. Microscopically this tissue was very suggestive of malignance: the masses removed were examined by the pathologist but on each occasion the report was that of granulation tissue.

Plasma-Fibroma of the Larynx. Dr. John M. Lorè.

This rather unusual and interesting case is presented again through the courtesy of Dr. White and Dr. Imperatori.

This patient, H. S., age 48 years, born in Austria, first presented himself at the Manhattan Eye, Ear and Throat Hospital on April 22, 1922, and assigned to Dr. McCullagh's clinic, complaining that for the past three weeks he had been very hoarse, had some difficulty with nasal breathing and had some soreness in region of his larynx.

This hoarseness dated back about nineteen years, having become very marked in the last three weeks, as mentioned above. He had a nasal operation fifteen years ago and two years ago he had his tonsils removed.

Examination at this time showed an epiglottis several times its normal size. The surface was irregular and presented some ulcers on its superior surface. Both ventricular bands and arytenoids had many wart-like growths. There was considerable interarytenoid thickening. The cords were not visible except at their posterior ends.

The nose presented signs of a sinusitis.

Diagnosis on Admission: Fibroma of larynx and sinusitis.

Clinical Data: Specimen of growth removed from right arytenoid showed: "Sections show a slightly hypertrophied stratified squamous epithelium. The sub-epithelial tissue shows dense hyaline connective tissue surrounding small and large areas of plasma cells. A few eosinophiles are present. None of the cells has active mitosis.

Diagnosis: Plasma-fibroma.

Remark: This is a slow-growing, recurring, non-malignant tumor. Would suggest X-ray or radium. (Report of Dr. Eggston, Pathologist to Hospital.)

November 12, 1922: Patient had first radium treatment at the Memorial Hospital (external block).

Shortly after this he had another treatment at the same hospital (also external block).

September 13, 1923: Laryngeal examination reveals a turban shaped epiglottis, hypertrophied to three times its original size with numerous ulcers on its superior surface. Inter-arytenoid thickening more marked. Left cord prevented from adduction by inflammatory areas.

Late in November, 1923, this patient was referred to the Bronchoscopic Clinic and under direct laryngoscopy several pieces of tissue were removed from the epiglottis, arytenoids and ventricular bands. Under direct laryngoscopy the entire glottis and epiglottis seemed to be studded with these wart-like projections, rather pale in color and with broad bases. The epiglottis was considerably thickened and presented areas of edema especially on the lingual surface.

When the specimens were taken there was moderate bleeding.

The pathologist reported as follows: "Lab. No. 27,376, Nov. 27, 1923—Th specimen consists of a small mass of soft tissue measuring 8x4 mm. Sections show slight hypertrophy of the surface stratified squamous epithelium. The submucosa consists of connective tissue, densely infiltrated with lymphocytes, plasma cells and some eosinophiles. There are numerous glands present which show semi-glandular inflammatory reaction.

Diagnosis: Plasma-Fibroma—This is a small round celled tumor of slow growth."

December 7, 1923: Another direct laryngoscopic examination was made and several specimens removed. Then five 5 mgm. radium needles were imbedded into the growth and left in for three hours.

Three of these needles were imbedded into the epiglottis and one each in the ventricular bands close to the arytenoids.

Report of pathologist of above specimens follows: "Lab. No. 27,534, Dec. 7, 1923—The specimen consists of several small fragments of soft tissue. Sections show same as previous examination area. In addition, there are several irregular papilli of epithelium which penetrate the fibrous tissue. In some areas there are isolated masses of epithelial cells. Some of the cells show mitosis.

Remarks: I think the sections show some evidences of an early epitheliomatous degeneration. However, the specimen is not entirely a satisfactory one."

About ten days later the larynx and especially the epiglottis showed some moderate reaction from the radium. However, the cords could now be seen for almost the entire length. There was good function present and his voice seemed better. The epiglottis was edematous and apparently the source of much pain.

December 21, 1923: Dr. Robinson applied 80 mgm. of radium on one-half inch block, 3 spaces, 5 hours each space.

Present Status: At this reading, the larynx looks much better, but the epiglottis is still hypertrophied and shows some areas of slough, where the radium needles were insterted.

The patient complains of much pain in the region of the soft palate and pharynx, probably due to the radium.

DISCUSSION.

DR. A. A. EGGSTON said there were several specimens removed at different times, all of which looked very much alike—the third time there was more epithelial tissue present than in the previous specimens. There are a great variety of tumors in the nose and throat, some fixed and probably teratomatous, and it is very difficult to classify some of them. There is a large class of round cell tumors which some put in the class of round cell sarcoma, but they are not malignant as are the typical round cell sarcomas in other parts of the body. In this particular instance

there were large accumulations of plasma cells surrounded by dense strands of connective tissue. The plasma cells are thought to be a modified type of lymphocyte and are found in the nose and throat, intestinal tract, in bone marrow and chronic inflammatory processes. We sometimes get plasma celled tumors in bone marrow, intestinal tract, fallopian tubes, and in the ovary. In this tumor the epithelium is not hyperplastic, and if it is a tumor it may be called plasma-fibroma. Of course, the possibility of its being an inflammatory condition has to be considered. Sometimes we do get true plasmo-celled tumors, which are very slow-growing. They are essentially benign but have a tendency to recur, and may be potentially malignant.

DR. ROBINSON: "No doubt, the previous radium treatments have altered the nature of the condition. However, I would like to suggest the diagnosis of rhinoscleroma. The man was born in Austria, and has had the condition for nineteen years. The gross appearance is not unlike rhinoscleroma. I am not familiar with the term plasmo-fibroma and do not know how it fits clinically with rhinoscleroma.

"The purpose of the radium treatments has been to restrain the growth rather than to destroy it as in a malignant tumor. Radium needles that are allowed to remain longer than three hours in this condition will produce overaction, and, oftentimes, a secondary infection results.

"The condition now shows a moderate reaction following the last radium treatment."

DR. HARRIS inquired whether the Chairman had seen any similar cases, and was answered in the negative.

DR. FORBES said that looking at it for the first time he would have thought of it as rhinoscleroma. Another interesting point was the treatment with radium needles, and it was most gratifying to note that the men using radium are shortening the time of application. At the Post-Graduate Hospital they had used the needle for five to seven hours, and had had infections. He was glad to see that the pendulum was swinging the other way and that this had been the possible cause of a number of abscesses which had occurred.

DR. WHITE said that when he had presented this patient over a year ago he was being treated at the Memorial Hospital and not much information could be obtained concerning him. At that time the case did not suggest rhinoscleroma—of which he had seen many cases in Vienna—but after the radium treatment the picture had changed, and did not know that he would venture a guess as to the diagnosis if he had seen it for the first time this evening.

Congenital Atresia of Posterior Choanae. Dr. M. Newton Jasper.

I wish to present two cases of congenital occlusion of a posterior choana.

The first, Miss K. D., 21, was referred to me on September 10, 1923, for a submucous resection of the septum which was markedly deflected to the right. She stated that she had never been able to breathe through the right nostril and that it was always filled with pussy secretion which she was unable to expel. After resecting the septal deflection I found that she was still unable to breathe through the right nostril nor could she blow it. Upon investigation, the cause of the difficulty was found to consist of a complete wall occluding the right nostril posteriorly. A very small portion of this wall, above, consisted of a dense membrane, the remainder being bone of considerable thickness, especially near the floor. About a week later I made a fairly large opening in this occlusion and as near to the floor as possible. The patient has been able to breathe as well as to expel secretion from the right nostril since the last operation but the opening which I created is much smaller than at first and is probably closing.

The other patient, Baby McG. is two and a half years old and was referred to me about the middle of last December for a tonsil and adenoid operation. Here also was a history that from birth the child was unable to breathe through the right nostril which was always filled with secretion. After removing fairly large tonsils and adenoids, I passed an instrument into each nostril and with a finger in the naso-pharynx found the left nostril perfectly clear, but the right was completely closed by a fairly dense membrane. I ruptured the latter and enlarged the opening as much as possible. The small size of the available working space precluded the possibility of much instrumentation. The patient has remained apparently normal. Should complete closure become re-established, which is highly probable, it is my intention to create an opening at the expense of the occlusion and the septum and to keep granulations down by frequent cauterization.

These congenital occlusions are due to the persistence of the bucconasal membrane. They may be complete or partial, membranous or bony, bilateral or unilateral. They are more common in females, and if unilateral, are usually confined to the right side.

DR. HUBERT said he had seen both cases and could corroborate all that had been said about them.

DR. MICHAELIS had seen only one case of this kind and that was unilateral. He was not able to study the case in detail, as he saw the patient, a little girl of about 5 or 6 years, only once and then only to operate on the same. Tonsils and adenoids had been previously removed and the family physician who called him to see the child thought there was an obstruction of the left side of the nose. A cursory examination disclosed this condition and when probed the instrument impinged on a bony obstruction. There was complete occlusion of this nostril. Under general anesthesia, a Knight scissors was thrust through this obstruction which was felt to be a rather thin bony lamella, and mindful of the fact that these occlusions tend to close again the scissors were rotated in order to enlarge the opening. He had not heard ffrom the case subsequently, and supposed that it remained open.

DR. HARRIS said that cases of this type had often been described and written about in the last twenty-five years or more, and his recollection was that something over one hundred cases had been reported. The usual outcome was what Dr. Jasper had intimated about his procedure—that sooner or later there is a closing up. The etiology, embryology, and character of the obstruction has been very thoroughly reported, both in this country and abroad. The procedure that has been recommended as most satisfactory is the submucous resection of the bone—the removal of the bony portion in connection with the bony obstruction. Where that has been done the report has been that the opening was permanent, and that it does not close up as after chiselling through.

DR. WHITE told of a case which he had not reported some years ago while on Dr. Smith's clinic, which he treated by breaking through the osseous portion, clearing it away as much as possible in all directions and keeping it open for a very long time by frequent applications of a strong nitrate of silver solution. Some time later the patient removed to California and when he last heard from her the nasal cavity was still patulous. This was about a year after the operation.

He then referred to an article by Lebensohn in the Annals of Otology, Rhinology and Laryngology for December, 1923, who reports a case and gives the following information:

These cases are most frequently diagnosed as suffering from adenoids, which are removed without relieving the condition. The first case was reported by Ottto, in 1830, occurring in a fetus. In 1854, an operation was reported on the first case noted in the living. One hundred and seventy cases have been reported to date, bilateral cases occurring three times as frequently as the single. The obstruction is usually complete, and is osseous in 90 per cent of the cases. In the newborn it is a definite emergency, causing cyclic dyspnoea.

Tonsil Tumor. Case for Diagnosis. Presented by Dr. Loré for Dr. McCullagh.

This patient came to the Manhattan Eye, Ear and Throat Hospital about two weeks ago and was assigned to Dr. McCullagh's Clinic. This patient stated that for the past twenty years he has had a mass growing in his throat, which when first noticed was very small and located in the region of his left tonsil. It caused no discomfort until recently when he noticed his voice had a nasal quality and he had some difficulty in swallowing solid food.

A few weeks ago he noticed a small swelling in front of and below the left ear. Only in the past few weeks has the mass in his throat shown any real activity in its growth. There has been no real impairment in his breathing.

Examination shows a man of about 45 years of age, fairly well nourished and apparently in good health. On speaking there is a nasal tone to his voice.

Nasal Examination: There is a moderate deviation of his nasal septum.

Throat Examination: The entire soft palate is pushed forward to a point opposite the second molars by a tumor covered by the normal epithelium of the soft palate which extends from the edge of the hard palate to as far down as the finger can reach—about the level of the upper border of the larynx. It apparently springs from the region of the right tonsil. The visible opening of the throat is the width of the uvula.

The consistency of the tumor is somewhat soft above the level of the tongue and very firm below. It seem to be well incapsulated. No tenderness on palpation. No ulceration. The swelling near his left ear is firm and apparently adherent to the deeper structure.

X-ray of neck region, to eliminate a bony growth, was negative.

Blood Wasermann was 4+.

In view of the blood findings no section was removed, but specific treatment started.

DISCUSSION.

Dr. Lore asked for suggestions as to treatment: whether to remove the tumor first and then radiate, or to radiate first and then remove; or to confine the treatment to specific treatment. The patient denied any venereal infection.

Dr. Smith did not think anyone could make a definite diagnosis by merely looking at the growth. It might be a lymphosarcoma, or it might be almost anything. The microscope would help, but if he were treating the case he would confine himself to anti-luetic treatment and would not try radium until he knew more about what he was dealing with; then he might remove it and use radium later.

Dr. Herzig stated that he had seen the patient about three days before in his private office. He was a well nourished man, 45 years of age and seemed in good health except for an apparent swelling to the outer side of his left mandible. Examination showed a tumor occupying seven-eighths of the pharyngeal space so that he had a very narrow chink through which to swallow food. He stated that he had been a moderate pipe smoker, denied venereal history, and that the result of blood test taken at the Manhattan Hospital was negative. Later, this was found to be incorrect, for the return was, as expected, 4+. The tumor was an enormous one, taking in the left nostril and pushing the soft palate up into the post-nasal space. This part of the tumor was of a semi-solid consistency and was not attached to any surrounding parts, such as the hyoid bone or mandible of the jaw. The lower portion was well below the mouth, was nodular, to the touch and very hard. There was no ulceration or discharge. The uvula was pushed over to the extreme right. There was no involvement of the posterior nasal space or of the larynx. The deep cervical and anterior glands were beginning to be involved and matter together.

Dr. Herzig said he believed the tumor to be a luetic type, with perhaps a sarcomatous element, though the slow growth without ulceration was against sarcoma. While sarcomata are not rare, they were usually attached to the surrounding bone when the growth had taken as long as this. He suggested that the patient be put on heroic treatment for lues, and if after a thorough course of intravenous injections, etc., the tumor failed to respond, that radium should be applied and later a section taken. The section should not be taken until after radium had been used.

DR. HARRIS asked that a further report be made on the case later.

Sinusitis with Polypi in Child Under Nine Years of Age. Reported by Dr. Loré.

The boy first came to Dr. McCullagh's clinic at the Manhattan Eye, Ear and Throat Hospital when eight years old. The mother stated that he could not breathe through his left nostril and that he had considerable discharge from both nostrils. His tonsils and adenoids had been removed some time previously for the relief of this condition, but no improvement was noted in his breathing. Examination at that time showed the left nostril to be almost completely filled with a polypoid mass; there was muco-pus in both nostrils. Posterior rhinoscopic examination showed a polypoid mass in the left nostril. X-ray of his nasal sinuses showed involvement of the left antrum and ethmoid. The right side was comparatively clear.

About one month ago a piece of this polypoid mass was removed for microscopic examination and the report came back that it was a piece of polypus. A week prior to presentation, the entire mass was removed, a thin pair of scissors being used to sever the attachment, the mass being pulled out with a pair of forceps. This large polyp measured 3x3.5x.5 cm., and the lower part had the imprint of the inferior turbinate. On looking into the nose again, another large polyp was noted far back. This was the one seen by the posterior rhinoscope. It was easily removed with a snare.

Bronchoscopic Observations on the Cough Reflex in Tonsillectomy under General Anesthesia. Dr. H. Arrowsmith and Dr. M. C. Myerson.

(Published in THE LARYNGOSCOPE, *January, 1924.)*

DISCUSSION.

DR. HARMON SMITH said that the argument presented was entirely new to him. Previously he had always advocated a light anesthesia because the laryngeal reflex was maintained and he supposed the blood and secretions of the throat were more than apt to be expelled by this reflex. The theory presented in the paper entirely undermined what he had been in the habit of teaching for years. Judging from the statistics presented the deeper the anesthesia for the removal of tonsils the safer the case was from infection in the lungs. From now on he would not urge the expeditious removal of tonsils and adenoids but on the contrary would advise deep anesthesia with plenty of time allowed for removal as well as for the control of hemorrhage.

DR. RUDOLPH KRAMER said the subject was so new that he did not feel he could add anything to what had been said, but could only corroborate what Dr. Myerson had stated about the presence of blood in the bronchi in cases of tonsillectomy in children; he did not feel prepared to discuss the question of the laryngeal reflex; the other points, however, had been noted frequently.

DR. BUCHANAN said that as with the previous speakers, the idea was very new to him, and he could only discuss the paper from the anesthetic side. A few of the nose and throat operators had requested him to give light anesthesia, but most of them required deep anesthesia, so that there were no reflexes observed, particularly gagging reflexes. He had always felt that patients so far anesthetized as to prevent the

gagging reflex were safer than those under light anesthesia who was constantly gagging. A number of years ago, Dr. Crile of Cleveland called attention to the dangers of very light anesthesia, particularly in nose and throat work, on account of the reflexes which may produce inhibitory respiratory reflexes, and made the recommendation that the entire throat be cocainized, so that if there was a light ether anesthesia it would not stir up reflexes. Under certain irritations of the nose and throat, a patient under light anesthesia will stop breathing; that is seen in general surgery. Dr. Buchanan said he had seen a patient stop breathing, after the putting on of a hemorrhage clamp, and the patient did not start breathing again until that clamp was removed and some other form of irritation stimulated the breathing reflex again.

It seemed that Dr. Myerson had brought out a very valuable point—viz., that those men who have thought they were protecting their patients by a light anesthesia have not been doing it, and that one should advocate a sufficient depth of anesthesia to permit the tonsillectomy to be done without gagging or vomiting.

Dr. Michaelis said that in a very large percentage of cases they had noted the presence of blood in the bronchial tree after bronchoscopy. How can one be sure that all the blood has been taken away from the hypopharynx, for instance and not some washed into larynx during bronchoscopy. It did not seem that so large a percentage of cases having blood in the bronchial tree and not having had some washed into the bronchial tree during the bronchoscopy.

Dr. Wolfe asked if suction apparatus was used.

Dr. Lore said that in the bronchoscopic clinic they had found that they had to get the patient very well under the anesthetic, and even then had occasionally to supplement the general anesthetic with cocain to abolish laryngeal spasm. Many of these patients that have to have laryngoscopy or bronchoscopy are inveterate smokers, and it might be that the mucosa is hypersensitive.

Dr. Knight said he was surprised to learn that such a large percentage of patients have blood in the trachea, and wished to know the position occupied by them during operation. He was accustomed to have his patients lie with the head lower than the body. He had tried both light and deep anesthesia, and found less bleeding under deep anesthesia and the patients did not have so much coughing; most of his cases were anesthetized by a specialist in anesthesia and if there are signs of obstructing mucus in the larynx, as can be determined by the breathing, he will let the patient come out sufficiently to allow him to vomit; that seems to clear the passage and the patient then breathes freely.

Dr. Myerson agreed with Dr. Harmon Smith that if we could get every patient to cough immediately after operation it would be almost an absolute guarantee of a clean tracheo-bronchial tree.

Dr. Buchanan's remarks were so self-evident that they called for no comment.

Replying to Dr. Michaelis, Dr. Myerson said that the same question had so frequently been asked that he always anticipated it; that any one who asked such a question could not be very well acquainted with direct laryngoscopy or bronchoscopy, for when the laryngeal spatula comes in contact with the epiglottis it is far above the level of the posterior pharyngeal wall where the tonsillectomy mixture accumulates. With the patients on their backs the glottic opening is fully 1½ or more inches above the pharyngeal wall, so that contamination of the instrument unless it is premeditated is practically impossible: It had been expressly stated that laryngoscopy and bronchoscopy were not performed until the pharynx was dry and clean, and free from blood.

As to suction, every effort had been made to use suction of a type that would empty the pharynx as rapidly as possible. They used a special water suction apparatus that works very well and rapidly.

Dr. Myerson regretted that he had not been able to follow Dr. Loré very well, but said that the pressure of the laryngeal speculum in sus-

pension laryngoscopy was quite different from the pressure of a rapidly passed laryngoscope for the purpose of introducing the bronchoscope; it is not usual to get that very firm spasm that sticks with the patient until you think he will asphyxiate. Such an instance had not been observed in this study.

As to the position of the head; the head was lowered to an angle of 45 degrees with the rest of the body.

To get the patient to vomit under certain circumstances might be all right, but most anesthetists are agreed that it is best to avoid vomiting in patients under general anesthesia; that is where some of our bad aspiration cases come from.

Fulminating Frontal Sinusitis. Dr. Alfred Kahn.

The patient, a young boy, was admitted to the New York Eye and Ear Infirmary, having been transferred from the New York Hospital. On the 28th of July, 1923, with a history of having had an eruption over the entire body while at the New York Hospital. He had also been constipated for three or four days; the eruption had almost cleared up; and a diagnostician from the Board of Health was called in and pronounced the condition to be non-infectious.

When he was admitted he had a very badly swollen eye; a very great swelling over the forehead and a profuse discharge from the right frontal region intranasally. Part of the ethmoid on the right side was removed and cleaned out, and drainage instituted; but it was suspected that a similar condition existed on the other side, and it was opened up. It seemed certain that he had a frontal sinusitis but we did not think that this could entirely account for the swelling over the forehead. His temperature was not very high, 100 to 102. It was thought there might have been a fracture with some depression, he having given a history of having been hit by a stone sometime previously. A small incision was made high up on the temporal region, along the hair line with the idea of finding a fracture of the bone. Then a counter communicating opening was made over the right frontal prominence in order to determine if the bone was perforated from the frontal sinus. A perforation could not be demonstrated. Drainage was instituted and the patient returned to his bed. The patient's condition immediately began to improve and the wound to heal; until on the 22nd of August his temperature advanced to 104. An X-ray previously taken gave no definite evidence of frontal involvement, so another X-ray was taken at this time. He began to show signs of meningitis. A spinal puncture was made and the fluid found under pressure with a cell count of ten. The wound was now probed and bare bone exposed. He was then sent to the operating room for a double radical frontal operation. The bone, which at the first operation was healthy was now found to be badly involved. At the second operation it was important to decide whether to make the usual Killian incision along the eye brow over each eye or whether to make an incision directly over the diseased area. We thought the latter incision best as it enabled us to drain the wound directly at the point of infection. A horizontal incision was made about one inch above the base of the nose four inches long, the center of the incision being directly over the base of the nose. From the middle of this incision a vertical incision was connected to it extending downward so that the soft parts could be thrown back and a wide bony surface exposed (the forehead, base of nose and both orbits). The bone was now chiseled following the Killian procedure. A large area involving the frontal prominences, nasal base and inner sides of both orbits was removed. From above and later from below the ethmoids and sphenoids were thoroughly exenterated.

Regarding the incision made in this case, Dr. Kahn said he wished to call attention to the advisability of making such an incision as this, since there was a chance of later doing a plastic and taking away the scar; whereas, if the incision was made through the eyebrows it would

have left a sunken scar that would not be corrected by a plastic operation. It was a question as to whether it wouldn't be well to use this incision as a routine.

Since the patient left the hospital he contracted arthritis in the left hip joint. This is probably a metastastis from the disease in the nose.

DISCUSSION.

DR. HURD said he thought that all the work performed in this case could have been done through a typical Killian incision made on both sides and joined across the root of the nose and this flap of the forehead turned back would have given sufficient exposure without the scar and deformity that this patient showed. This boy has probably had an osteomyelitis and may not be entirely out of danger. I have done the double Killian incision and joined across the root of the nose in several cases without noticeable disfigurement afterwards.

DR. HARMON SMITH said that he would not hesitate to correct the transverse scar but would advise waiting until all possibility of a periostitis had disappeared.

A New Instrument and Method for Tonsillectomy. Dr. J. E. Braunstein.

DISCUSSION.

DR. MARK J. GOTTLIEB said he had had some experience with the instrument and found it to work very well. Only the tonsil was removed and the results were very gratifying. One could easily realize that there being no trauma to the pillars themselves, the after pain would be very much less than with the Sluder or dissection method.

He also had had the experience of not being able to get at one tonsil which was very flat and had apparently been cut with the ordinary guillotine. The instrument seemed complicated, but was in reality very simple and thanks were due to Dr. Braunstein for presenting it.

DR. KNIGHT asked about the appearance of the throat several months after operation. He was accustomed to using the Brown-Sluder tonsillotome, and obtained splendid results with it, but noticed that some months later there was in some cases a line of what seemed to be scar tissue radiating toward the side of the throat. He thought this could be obviated by the use of a sharper blade, but it seemed that with Dr. Braunstein's instrument the membrane was not cut through, as is the case with the Sluder and dissection operation, but is torn through by the wire; this would naturally produce even more radiating scars than in the use of the former instrument.

DR. HARMON SMITH said that he had tried the three Warren Suction Tubes in the removal of tonsils but without success. Some years ago when he first employed the Hurd suction apparatus for cleansing the tonsils he was impressed with the possibility of employing this method to engage the tonsil in a snare and so remove it without injury to the pillars. However, his mechanical ingenuity had not enabled him to perfect the instrument and he was glad that Dr. Braunstein had presented an instrument which appeared to make it possible to employ suction and at the same time remove the tonsil without injury to the pillars as well as prevent the secretions from being inhaled into the lungs. If such a method is practicable in the hands of the majority of operators it will have accomplished that which has been desired by all operators. He, however, would remain skeptical as to its universal application nutil he had witnessed its employment.

DR. LORE said he recently tried the Waring suction instrument at the Manhattan Eye, Ear and Throat Hospital with poor success. He was able to suck the tonsils with the instrument but as soon as traction was put on the snare an opening would be created between the tonsil and instrument in the region of the lower pole, thus allowing air to get in thus destroying the vacuum. He also noticed about the same amount of post-operative bleeding as he did with the dissection method.

DR. LORE complained of finding difficulty with the glass tube to remove the entire tonsil.

DR. BRAUNSTEIN advised that since the lower end of the tonsillar fossae is the shallowest, that the instrument must be turned upward toward the supra-tonsillar fossae, where the anterior pillar as well as the soft palate will cover the mouth of the tube and prevent the loss of suction, thereby having a better grip on the tonsil.

Dr. Braunstein could not report on the appearances of the throats so far, though since the anterior pillar is not injured, it may be assumed that that band of scar tissue would not appear. There are about fifty cases on record at the Greenpoint Hospital operated upon with the Suction Snaretome, letters have been sent out for the patients to return for examination but so far have failed to respond.

He thanked Dr. Smith for his kind remarks, and aswered his question in re. of not seeing the wire.

I do not use the glass tube as I have advised and written against same. Whether you use the glass or metal tube you cannot see the wire loop that is behind, for in the glass tube the tonsil acts as an opacity, but in the metal tube this difficulty is eliminated by the seat and hook which I have added on which brings the snare to the edge of the mouth and we need not worry about the wire on the so-called posterior surface of the tube.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

February 27, 1924.

Carcinoma of the Larynx Removed by Suspension Laryngoscopy. Dr. Sydney Yankauer.

Both of these patients were shown before the Section between one and two years ago and are brought back to show that both are entirely well to date.

The first, a young man 29 years of age, when he was first seen two years ago, had a small growth on the right vocal cord which we suspected of possible malignancy, but could not be sure. A specimen was removed and a diagnosis of carcinoma was made. He was then treated with radium, the treatment being carried out with the full erythema dose 4000 mc. hours. By that time the cord had become practically flat. After having used the full erythema does of radium the cord was excised under suspension laryngoscopy. It was then examined microscopically and in the center of the cord was a mass of cells which the pathologist declared to be disintegrated carcinoma cells. In removing the cord under suspension laryngoscopy a small portion of the cord in the anterior commissure was left in place; the cord was excised down to the cartilage and subglottically until we got to the tracheal wall. The wound healed without difficulty, and when the scar formed it was stretched, and in that way a projection of the scar was formed which now appears as a fairly good cord, and which functions perfectly. The man's voice leaves nothing to oe desired. The patient is a commercial salesman and uses his voice a great deal.

The second case was first seen four years ago and have a history of being hoarse for one year. He had a tumor on the right vocal cord extending into the subglottic region. A specimen showed this to be a mixture of sarcoma and carcinoma. The entire mass was removed under suspension laryngoscopy. The wound healed kindly without complications, and this patient also has a good voice.

Up to the present time neither of these cases has had any indication of recurrence.

This one is an intrinsic carcinoma of the larynx, but I have operated upon four extrinsic carcinomas in the same way, removing the epiglottis, aryepiglottic fold, and arytenoid. Only one of these cases had a recrudescence of the growth. The others have remained free from

carcinoma until now, eight years since operation. Radium was used on this case afterward, but at the time we used the radium without sufficient filtration and had a severe radium burn. That was just before I went abroad during the war, and the larynx contracted so much that the patient suffered from dyspnoea and had to have a tracheotomy done. When I returned he was still wearing his tube, and I hesitated to remove it for fear of irritating the scar by dilation. One of the four died of a recrudescence; and another went for a year without any trouble and then died of carcinoma of the lung. At autopsy the larynx was found free of recurrence. All of these cases had radium treatment.

I believe it is possible to so limit the carcinoma with the use of radium and deep X-ray therapy that it will be possible to remove many fo these growths with suspension laryngoscopy and save the patient's life and his voice also.

DISCUSSION.

Dr. Harmon Smith said that while 29 years of age for carcinoma to appear in the larynx was nevertheless possible and even cases had been reported in cases much younger it was nevertheless unusual. His only unusual experience had been in a case of a young man 31 years of age, but that he had had recently a squamous celled carcinoma of the antrum in a child of five years.

Lynch had reported several cases of carcinoma of the larynx removed successfully by suspension laryngoscopy. Ballenger, St. Clair Thomson and himself had each had a case removed by the indirect method with more or less favorable outcome, although the diagnosis of cancer at the time of operation was not considered.

All of these reported cases showed conclusively that intrinsic pedunculated carcinoma of the larynx could be removed either directly or indirectly by those qualified in this field of surgery. The question at issue, however, was whether it was good surgery and advisable to resort to this method of procedure when a laryngo fissure offered a safer and saner method of operation. That Lynch and Yankauer were qualified to remove these growths by suspension and had reason to expect as favorable result as if done by laryngo fissure but this fact by no means justified the argument that all laryngologists could accomplish the same. Some were peculiarly gifted in technique which others could not acquire, and it was not a justifiable argument to advocate such a procedure without qualifying the necessity for such dexterity before attempting an operation which embodied, as it did, such dangers to the patient.

Dr. Smith further emphasized the inability of the microscopist to differentiate between a virulent carcinoma and one of less virulence. That it was quite possible that the successes reported from the suspension cases were those of slow growing type, and even if left alone would not have assumed a fulminating character for years afterwards. He referred to a case of his which had been observed first by Dr. Gleitsman thirteen years before it came under his observation and even then went a year before laryngectomy became necessary.

He believed that if it became a universal practice for all laryngologists to resort to suspension for operation upon intrinsic cancer of the larynx that great harm would be done, and that even the laryngo fissure operation was one of questionable advocacy unless performed by a laryngologist of considerable experience. So far as removing an extrinsic cancer of the larynx under suspension was concerned he considered it unjustifiable.

Dr. Harris said he could only reinforce what Dr. Smith had so well said in regard to operation on these cases. He wished to add, however, that Dr. Yankauer had shown a high degree of efficiency in these cases. They were perfect. As Dr. Smith had said, many other men would have done a bungling job. It was a large question, and whether the

members as a Section were ready to unqualifiedly endorse this operation offered food for thought.

In the first case presented, Dr. Yankauer was almost dealing with a case by itself: the age of 29, the incipiency of the growth, its location, and its limitation. If there were a justification for doing the work, that seemed to be a suitable case; but if he had in consultation seen the other cases presented, he could not have given his consent to it. Of course, one has to think them through with a view to the ultimate result. The claims of a cure by means of radium where the growth has been removed for a year or two, are not right. Enough time has to be allowed to elapse to be sure whether or not there is a recurrence; and in the case of this young man no one is able to say that radium has played a considerable part or claim its great advantages. Dr. Smith struck a very important note in speaking of the degree of malignancy in these cases. Dr. Moure brought that out a great many years ago. They differ very materially, and it is not right to assume that a particular case at hand is a mild type and that mild treatment will produce the desired result.

Dr. MacKenty said he was very much interested to see these cases because they threw fresh light on the work which laryngologists are trying to do today, that with the skill possessed by Dr. Yankauer and a few others in this country it is possible to remove a small cancer successfully by suspension laryngoscopy, may be admitted, but that an extrinsic case should recover after removal of the growth by that method is an entirely new thing to him, for, as he had stated before, he had never seen an extrinsic case of the larynx get well by any method. A year and a half before a patient had consulted him with a small pedunculated carcinoma from the pyriform fossa. This was removed and afterward looked all right and the man went home but when he return later the growth was beginning to grow again. A total laryngectomy was then performed, but before he left New York to go home he had a recurrence of carcinoma on the same side of the neck.

Dr. MacKenty said his experience had been that in this extrinsic work there was 100 per cent mortality; none that he had seen had ever recovered. In a thyrotomy case where most of the larynx is removed, it does not recur in the larynx, but in the neck—and that result had carried off some of his cases of thyrotomy. The question of the degree of malignancy, had not yet been determined, but there was no doubt about the difference in degree. He had had three cases in the last few years watching them and not being able to decide whether they were malignant or not. Part of the growth was removed and it was reported malignant under the microscope; but in spite of that he felt doubtful, and the patients were given small doses of iodid of potash and treated with astringents, and the growths entirely disappeared. One of these patients was an old man of 70, from Nashville. The growth of the cord was examined under the microscope and reported to be squamous celled carcinoma. This was entirely well now with the exception of a piece that was not taken out. You may send specimens to different men and one man will say a case is malignant and another, not. In one instance a tumor of the palate was under consideration. and a very good pathologist pronounced it malignant; another said it was non-malignant. The question of malignancy or non-malignancy has not yet been proved.

In justification of Dr. Yankauer's case of the young man of 29, Dr. MacKenty said that he and Dr. Yankauer had seen a woman of 26 with a carcinoma of the larynx, which was diagnosed by taking a section. It was undoubtedly carcinoma, for it progressed and was operated upon and died—so that carcinoma of the larynx may occur in even younger persons than this patient. In total laryngectomies, taking the early and late cases, the best record that he has been able to show of non-recurrence was about 80 per cent—so that 20 per cent die of cancer even where the neck is still apparently not involved and the disease has not reached the arytenoids.

His statistics showed only 20 per cent of cures with radium—80 per cent of these cases dying of cancer. Dr. Yankauer was to be congratulated on his skill in doing this work.

DR. YANKAUER said that he agreed with everything that Dr. Smith and Dr. Harris had said. If he could have operated in this way on every case that he wished, he would have been able to show a much larger series, but in the extrinsic cases he had operated only on those who refused laryngectomy. It may require special skill to do this work, but if he could do it there was no reason why others could not learn; and if it is possible to remove a carcinoma in this way and save the patient's life and voice, he proposed to keep on doing it and to teach others with whom he came in contact to do it also. He called attention to the changes that have taken place in the practice of laryngology since he and Dr. Smith began to practice, at which time there was very little work that required great technical skill, as we understand the term today.

DR. SMITH disagreed with Dr. Yankauer's last statement and said he believed the older men had greater technique and skill than the present generation and were able to remove tumors of the larynx when they did not even have the aid of cocain to facilitate their technique.

DR. YANKAUER rejoined that the younger laryngologists of today were all men of a higher degree of technical skill than when he himself was a young man; the character of the work now done in the nose and throat trains men to do this type of work and to do it well. When bronchoscopy was first presented to the profession, it was extremely difficult to manipulate the instruments, yet hundreds of men do it today. He felt that it would be quite possible for him to train some of the younger men associated with him to do this work, and to do it perfectly. At any rate. he proposed to continue doing it in this way, and if in future he can present a sufficient number of cases, as he hopes to do, its practicability will be proved. No matter how much skill is required, the profession owes it to the public to do the best that can be done for these cases.

DR. HARMON SMITH said that it was not vouchsafed to all to acquire the mechanical skill and efficient application of Dr. Yankauer. The same might be said of Dr. Lynch of New Orleans. That so far as *indirect* laryngoscopy was concerned he did not "bend the suppliant knee" to anyone, but that when it came to direct laryngoscopy he not only felt but acknowledged his inferiority. He believed that when the eye and the hand co-ordinated properly that great results could be obtained by the direct method; but that when it became necessary to change glasses for each additional inch or so in the direct method that it materially handicapped the operator. Some men were gifted in certain lines of work but just as all men could not become artists just so all laryngologists could not become bronchoscopists.

DR. HARRIS asked Dr. Yankauer to restate the conditions under which he proposes to do endolaryngeal work for carcinoma.

DR. YANHAUER, rsponding to Dr. Harris said: "In the first place, all intrinsic cases can be removed under suspension; perhaps that is a rather broad, statement, but it is possible to remove under suspension laryngoscopy, epiglottis, aryepiglottic folds, arytenoids, the false and true cords. I have done it successfully several times. How much more may eventually become possible we do not know, but I expect with improved instruments to do more than I have done up to the present time. Not every laryngeal tumor, however, is suitable for this sort of work. (Gave example.) I have done under suspension a case of similar type in which the tongue was involved, but not with the expectation of curing the condition. On the other hand, I have had failures. Under suspension laryngoscopy we do have the spatula against the tongue, and where the growth is too close to the tongue you will not be able to get beyond it by suspension laryngoscopy; but where the growth is further back in the larynx, it is possible.

The question of whether or not a given case can be operated upon under suspension laryngoscopy depends entirely on the local conditions in the throat—whether it can be suspended and whether the carcinoma is far enough away to permit it to be cut out, etc.

DR. MACKENTY asked why one should go through such difficult and awkward and complicated technique when there is a much safer and efficient way in thyrotomy. There is no objection to opening the larynx. He could not see any necessity of doing this work by suspension. It is about as logical as vaginal historectomy so much misused a few years ago.

DR. YANKAUER replied that in what he had seen of thyrotomy the voice was ruined more often. If you cut through the anterior commissure it is difficult to make the larynx symmetrical as before. If you do a suspension and leave a small corner of the cord in place, you will have something to grow from so that the patient will get a cicatricial cord.

DR. MACKENTY said he had not observed that the voice was so very bad after thyrotomy; the results had been as good and better than the second case shown by Dr. Yankauer. All his living thyrotomies have fairly good voices.

DR. YANKAUER added that there was another point against thyrotomy —you have a mass of scar tissue, and that is apt to keep the cords separated, even if it does reform. At any rate, his own experience with thyrotomy had not been so favorable to the voice, and he could not agree that one got so much better exposure unless the cricoid was cut. You have to work down in a deep hole, and that is just as difficult as to work under suspension.

Replying to an inquiry as to the amount of bleeding, Dr. Yankauer said that there was very little bleeding during the operation, but in two instances there was profuse bleeding afterwards, necessitating tracheotomy. This was one of the objectives which he has not yet been able to overcome completely.

Showed Case III.

Angioma-Sarcoma of the Larynx Removed by Indirect Laryngoscopy. Dr. Sidney Yankauer.

The patient was a man of 65, first seen about a year previously, with a pedunculated growth on one of the vocal cords about as large as the end of a finger—2 cm. in diameter—a deep, red, pedunculated growth. The whole of it was removed with the cold snare by means of indirect laryngoscopy, and it proved to be an angio-sarcoma. The patient was then supposed to be referred to the Memorial Hospital for treatment, but he never got there. He has had no recurrence of the growth.

Post-Typhoid Stenosis of the Larynx. Two Cases. Presented by Dr. Yankauer.

These two patients were living in Russia four or five years ago during an epidemic there, and both had to have tracheotomies done during the course of the typhoid fever. The first had been decanulized and had a small fistula into his trachea, causing some difficulty in breathing when this fistula was closed. The stenosis was dilated with the direct laryngoscope and Jackson's dilators; he had since been kept comfortable for four or five months, but was still under observation for fear of a recurrence of the stenosis.

The second patient had a thyrotomy done in Berlin, and had a most peculiar apparatus put in his throat—the introduction of a large piece of rubber tubing, one end of which was closed. Opposite the tracheatomy wound a hole was made in the rubber tubing and the tracheotomy tube inserted into that. The end of the tracheotomy tube was separated from the wall of the trachea by rubber tubing. This was removed from the larynx under suspension laryngoscopy, but it was impossible to remove the tracheotomy tube as the larynx was completely paralyzed

so that the mucous membranes relaxed and fell together when he tried to breathe. Accordingly the tracheotomy tube was re-introduced. The larynx was dilated and the granulomata that had grown there was removed, improving his ability to breathe. Later on he would be decanulized.

Tuberculosis of the Larynx with Pathological Changes Simulating Carcinoma. Dr. Julius Gubner.

Carcinoma of the larynx associated with tuberculosis is a condition rarely met with. Because of the infrequent occurrence of this condition, I thought that the report of the following case would prove of interest:

S. R.: Male, age 68 years, tinsmith, came to the Mt. Sinai Clinic to be relieved of hoarseness and some dyspnoea.

Family History: Father died at the age of 84; mother at the age of 80; cause of death, as given, was of old age. Two sisters died at ages over 80. No history of malignancy or tuberculosis in the family.

Past History: Had never suffered from any illness, except from cough that began 20 years ago. He has five children and 13 grandchildren who are well.

Present Illness: About 2 months before he came to the clinic his voice became hoarse and he complained of shortness of breath. No pain in the pharynx, larynx, neither did he ever feel pain on deglutition.

Examination: Nose, marked deviation of the septum to the left; both inferior turbinates are hypertrophied. Pharynx, negative; larynx, left false cord was thickened, red and nodular. It appeared to be higher than the right one. The right false cord was not swollen, only reddened. The left vocal cord was not visible. The right cord was visible, but its identity was lost in the swollen and reddened mucous membrane. The interarytenoid space was not infiltrated.

The position of the cords was midway between adduction and abduction with limited movements.

Laboratotry: Wassermann test was negative.

I removed a piece from the left false cord for examination and received the following report from the pathologist "tuberculosis. In addition there is a beginning epithelial proliferation resembling early malignant change."

X-Ray of the Chest: "Examination of the chest shows an extensive bilateral tuberculous process. The entire right lung shows scattered closely set military tubercles with a cavity at the right apex about 2 inches in diameter partly full of fluid. In the left lung the infiltrations occupy mainly the lower lobe where they are confluent and produce an appearance of a lobular tuberculosis."

In the case under consideration, examination suggested a condition of malignancy and my tentative diagnosis was—carcinoma—but to our surprise the pathologist found it to be a case of "tuberculosis with early involvement of malignancy."

The question there, which we should like to have answered is, whether the carcinoma began as a new and distinct growth, developing independently, or did the presence of tuberculosis constitute a predisposition? It is generally agreed that the exciting cause of malignant growth is due to some trauma or irritation. In this case, where there was a long standing irritant, the expectorated sputum (and) the troublesome cough and the lowered resistance of the cellular structures, which condition combined favored the epithelial cell infiltration.

This case is of interest not only from the standpoint of diagnosis and pathology but also regarding the treatment.

Literature: In reviewing the literature beginning with 1922 and going back to 1903, I found only four cases of combined cancer with tuberculosis of the larynx: 1. By Wolfenden in Zentralblatt f. Laryng., 1893, s. 555; 2. Clifford Reale in London Laryngological Society, Nov. 15, 1896; 3. By Moritz Schmidt in Krankheiten der oberen Luftwege, 1 Anfl., 1893;

4. Schröder, Blumenfeld in Handbuch der Therapie der Lungen und Kehlkopfschwindsuches, 1 Anfl., 1903.

DISCUSSION.

DR. MACKENTY said the case was well worth reporting for the combination of tuberculosis and cancer was very rare. A few cases have been reported of TB, cancer and syphilis combined, just as in the case presented by Dr. Gubner. Cancer and syphilis are very frequently seen in combination, but he himself had never seen a case of cancer and tuberculosis like the one shown before, where it has been worked so thoroughly, so it was doubtful whether radium treatment was justified, and it was very dubious whether radium has ever cured a well developed case squamous cell carcinoma.

DR. EGGSTON inquired as to how much evidence of malignancy there was. Tuberculosis and syphilis and other chronic inflammatory processes are not infrequently associated with carcinoma in other parts of the body, breast, cervix, tongue, etc. In this instance there might be some question as to whether the patient had both diseases. Very frequently in epithelioma there will be infiltration of the cells into the submucosa with the formation of giant cells, and with tuberculosis or syphilitic process there is considerable irritation which may cause a physiological hypertrophy of the surface epithelium. This case should be followed closely in order to settle the diagnosis more definitely.

DR. HARMON SMITH said he doubted very much if this was a combination of the two diseases; that it seemed quite likely in a man of such age it would be more likely to be an epithelioma irrespective of what might be found in the lung. It would be interesting to know the temperature the man was running and whether he was having chills, sweats, etc., characteristic of phthisis.

DR. GUBNER said he had questioned the man very closely and he denied that he had ever had any tuberculosis.

DR. SMITH said he did not think the man had tuberculosis. It was important to emphasize the basic facts; in the first place, the patient's age was against it; secondly, the absence of temperature; thirdly, the absence of cough. If the man had pronounced tuberculosis he would have had some cough or temperature. He did not question that the patient had cancer, but he did question the combination of cancer and tuberculosis.

DR. YANKAUER said that the X-ray diagnosis of the chest in this case was very definitely tuberculosis; although that might not be positive, yet the pathological examination of the specimen removed was definitely tuberculosis of the larynx. The carcinoma was not positively diagnosed by the microscope, but the changes in the growth were suggestive of carcinomatous degeneration. So far as could be determined, the case seemed to be definitely tuberculosis of the larynx with a question as to the carcinomatous degeneration.

DR. SMITH said that he did not place such absolute confidence in the laboratory as did some. The pathologists were just as liable to error in making a diagnosis as the laryngologists, and he would be just as willing to rely upon clinical diagnosis as a pathological in some cases. He had seen tubercular tumors of the larynx of that size, but that this was the oldest man in whom he had ever seen tuberculosis of the larynx.

DR. EGGSTON said that Dr. Smith had stated just what he himself had wished to say. The past, and to some extent the present, attitude of the clinician to the pathologist has been and is absolutely erroneous. In the past the pathologist was put up in the attic, so to speak, and asked to make a definite diagnosis, without the aid of the clinical findings in a case. This attitude is entirely faulty. The pathologist should be placed in the position of a consultant on an an equal footing with the specialist of other phases of medicine. If there is co-operation of the clinician with the pathologist the latter can be of more service to the former, and fewer erroneous diagnoses will be the result besides the numerous other advantages to be derived from such a co-operation.

Unfortunately a pathologist cannot interpret the physiology or the

biology of a tissue. It may be some day this may be possible, but until that time comes the pathologist is just as likely to make mistakes in border line cases of malignancy as is the clinician, if he simply considers the morphology of tissue when it is sent to the laboratory. There are border line cases where it is impossible for a pathologist to say definitely the nature of a tissue. One can get in these cases as many diagnoses on a piece of tissue as upon a clinical examination of a patient. There is nothing more difficult than the diagnosis of tissue, and nothing carries with it more responsibility. The pathologist, therefore, should have all the facts upon which to base conclusions.

DR. GUBNER, answering Dr. Smith, said that at first he had the same impression that Dr. Smith expressed and had questioned the man regarding his past history but it did not reveal any illness; he had never been sick and had never lost a day of work, he had had no temperature and no sweats. The only complaint made was that three months ago hoarseness began, which grew worse and worse. The diagnosis of carcinoma was made upon the history and the physical examination, and, just as Dr. Smith had stated, the man's age, suggestive of carcinoma—his age and past history. The pathologist, however, did not commit himself to its being carcinoma.

The appearance of the cord as presented was entirely different from what it was two or three weeks ago—which would also suggest carcinoma rather than tuberculosis. The case would be worked up further and another specimen would be examined.

DR. KNOPF told of a case seen in Dr. Harmon Smith's clinic bearing out what Dr. Smith had just said. The case showed a typical carcinoma, but further examination showed a profuse amount of tuberculosis in the chest by the X-ray, and tubercle bacilli were found in the sputum, still the specimen did not show anything but carcinoma. Both sides of the larynx were involved.

Chronic Pulmonary Suppuration Cured by Bronchoscopic Irrigations.
Dr. Sydney Yankauer.

These three patients had post-pneumonic bronchiectasis with suppuration. They were treated by bronchoscopic irrigation over a period of six months to four years. Two of them were under treatment for four and two years and are now apparently entirely cured. The expectoration ceased and the shadows in the chest have cleared up. The third patient was a recent case of about six-months' duration, which has improved about 90 per cent, but is not yet completely cured. He lives out of town and so long as he stays out of town he does not cough, but begins to cough as soon as he returns to the city.

The treatment of these cases by bronchial irrigation is a long procedure; it has to be kept up for a very long time. The quickest cure that has ever been obtained took about six months, but the condition is one that does not yield rapidly to any form of treatment. The cases that have been selected for this treatment are those that the medical men have found intractable by their methods and the surgeons have refused to operate on them, so they are almost hopeless. We have cured about 8 or 10 per cent; but about 90 per cent are sufficiently improved to earn their living and support their families—coming to the hospital for irrigation as their condition requires. Considering the type of the case and the fact that they are enabled to be self-supporting with a certain amount of treatment is sufficient encouragement to keep it up, and we feel that we are doing pretty well.

DISCUSSION.

DR. MYERSON said that the subject of lung abscess, particularly the chronic type with which the bronchoscopist comes in contact, is very fascinating. They were following Dr. Yankauer's lead at the King's County Hospital and were doing considerable of this work. A tube had recently been devised for suction and irrigation of upper lobe abscesses which works very well.

It had been their experience that chronicity in lung suppuration was not dependent upon a time limit but is based entirely upon the pathologic changes. And even the X-ray man, good as he is, the clinician, and the bronchoscopist together, cannot tell what the pathology is in a given subject; that is, from the standpoint of local tissue change. Dr. Myerson therefore suggested that in speaking of chronic pulmonary suppurations cured by bronchoscopic irigations it would be better to speak of them as a clinically or apparently cured. There were cases of short duration where the pathology had not extended to the point where fibrosis had formed a limiting wall for the cavity. Also there were cases where a larger bronchial element was not the basis for a bronchiectatic cavity. It is in these two types of cases where spontaneous cures frequently result. Such cases are cured permanently or apparently in a comparatively short time, with the aid of the bronchoscope.

Dr. Myerson said he would like to know what Dr. Yankauer meant by post-pneumonic bronchiectatic cavity. He pointed out that post-pneumonic suppuration usually begins as a primary suppurative pneumonitis with extension into and involvement of the adjacent bronchial elements. He wanted to know whether Dr. Yankauer did not agree with this, and that therefore it might not be exactly correct to call this type of suppuration bronchiectatic cavity.

Whether cured or not, these cases are benefited and do well after bronchoscopic irrigations. One type of patient which Dr. Yankauer did not mention was the lung abscess of long standing, which are practically hopeless when they come to the bronchoscopist. However, they can be made more comfortable by irrigation, though these processes have extended so far and have lasted so long as to indicate a fatal termination. These cases should be referred for surgery and only treated bronchoscopically when they refuse the radical procedure. He then cited the case of a girl with an abscess of thirteen years duration, for whom he had advised lobectomy; but was requested to carry her along by palliative irrigations until after almost a year she finally died of sepsis and cardiac depression.

Dr. Harmon Smith said that having once been an interne in the King's County Hospital he could readily acquiesce in the number of cases of bronchiectasis found in its wards. That formerly they were relegated to the tuberculosis wards where many died, but occasionally some interne with a modicum of sympathy in his makeup isolated these cases, put them on inhalations of medicated steam and intertracheal injections of medicated oil and not infrequently a case would recover and in departing pronounce his blessing upon the ambitious interne. In reference to Dr. Yankauer's cases Dr. Smith wished to express his ardent appreciation for any man who would for four years continue to wash out and treat such unwholesome cases as those presented. It required not only patience but skill and that he bowed in deference to any man so qualified. He would like Dr. Yankauer in closing to amplify his methods and designate the kind of solutions employed.

Dr. Eggston asked if Dr. Yankauer had treated any cases of bronchial asthma of the suppurative nature by pulmonary irrigations.

Dr. Yankauer, answering Dr. Eggston, said they had not undertaken any systematic study of bronchial asthma, excepting a little work on the bacteriology of the bacterial type of asthma. They hoped to be able later to take up the asthmatic and chronic bronchitic cases.

The type of lung suppuration varies a great deal. They had cured some cases with a distinctly localized pus cavity following inhalation post-tonsilectomy; and had cured some cases of fairly chronic suppurations localized in a part of the lung which had just recovered from a typical pneumonia. These cases were irrigated with a double cannula, directing it in such a way that the stream of the fluid enters the bronchus from which the pus comes; they had not followed the bronchi down to the abscess cavity for the purpose of injecting medication to the cavity, to any extent, as they had not seen any benefit from that, but they

reach the entrance to the bronchus and get the pus diluted so that it can be removed as satisfactorily as if the cavity were entered. They used a solution containing carbolic acid and tincture of iodine 1-500. All kinds of solutions had been tried and no one seemed to be much better than the others. Salt solution would do as well as any; it was only to dilute the mucus and make it easy to wash it out. You cannot remove the secretion from the bronchi by aspiration. After irrigation the white outlines of the cartilaginous markings are more clear and distinct. He was inclined to feel that the carbolic acid and tincture of iodine was a little better than salt water. The main object of the irrigation was to dilute the mucus and remove it by means of suction. The effect on the case is rather prompt—the odor disappears and the amount of secretion diminishes. One of the worse cases he had ever seen with enormous quantities of pus was so improved that he has hardly any cough remaining, and has been married since his treatment. He reports once a year for observation. He has practically stopped coughing even though he is not theoretically cured.

Lymphangioma and Hemangioma of the Larynx. Dr. Rudolph Kramer. (By Invitation.)

DISCUSSION.

DR. HARMON SMITH expressed his appreciation of the paper and the work entailed, but at the same time he believed that any paper presented before the section should not be published before a careful scrutiny by the members thereof had acknowledged its basic facts as unquestionable. It was quite possible to have lymphangiomas appearing wherever lymph space existed, and that the false cord presented a most favorable location. The number of these tumors reported, however, has been very limited. The firse case of this kind was reported by Koschier in 1895, in the *Wiener Med. Blatter*. Menzel, however, reported a greater number and enlarged upon the subject at a later date—1904. In regard to hemangiomas he felt that it was possible that a number of those reported by the author of the paper might be mixed tumors in which the angiomatous material predominated. He felt that a clinic in a general hospital having eight hemangiomas of the larynx in two years was disproportionate to the experience of laryngologists in other hospitals, some of which were devoted entirely to the eye, ear nose and throat. To be able to report fourteen cases of hemangioma of the larynx in one paper would naturally induce the opinion in the minds of other laryngologists that some must have been mixed tumors and that the pathologist reported upon only the part most given to angiomatous construction. Any vascular tumor of the cord bound together by a scanty stroma could be called a hemangioma. However, the greater number of these vascular growths predominate in fibrous tissue and should not, in his opinion, be classed as hemangioma.

DR. EGGSTON said it was certainly very easy to be misled in the diagnosis of tissue from the larynx, for many of the tissues from that area are much more vascular than inflammatory tissue from other parts of the body. Many of the so-called polyps of the vocal cord, the result of chronic irritation, when sectioned will show quite cavernous lymph spaces and blood vessels, and it seemed as if one or two of the slides shown by Dr. Kramer were of that character. However, several of the slides (one in particular) looked like the cavernous venous hemangioma, and one or two like the hypertrophic capillary lymphangioma in which the capillaries were increased in number and with hyperplasia of the endothelium cells. It is very easy to make an erroneous diagnosis of angioma in the nose and throat. It is true that small hemangiomata will develop spontaneously over a short space of time and will equally rapidly disappear. One must be careful in calling all the vascular lesions in this region angiomata.

DR. YANKAUER said he had nothing to add except to say that all these cases had been very carefully studied, particularly with the view to

excluding just what had been mentioned—fibroma, mucous polyps, and other benign growths that have become suffused with dilated blood vessels; this had been done with the greatest care and the slides of every one of these cases are here and can be seen under the microscope to verify the diagnosis. They had had any number of other benign growths that might easily have been included in the series if care had not been exercised to eliminate everything that was not a true lymph— or hemangioma.

One phase of the subject was that the majority of these growths were removed by indirect laryngoscopy; there was a definite reason for that. When a patient is suspended the vocal cords are stretched and the mucous membrane becomes tightened and a good part of such a small growth is submerged, and unless you perform a cutting operation you are not likely to get it all out; whereas, if the parts are relaxed you can press the mucous membrane down and get it all out in one piece. For that reason, wherever possible, he has used the indirect method in preference to direct or suspension methods.

DR. KRAMER, replying first to the question of pathological diagnosis, said he had found many cases in the literature reported as hemangioma that were not such. They were either mixed growths, such as angiofibroma, or varices. He had seen a number of these types of growths, but they were not included in the series here reported. He had had the microphotographic lantern slides made so as to illustrate the histological structure of true hemangiomata and lymphangiomata to the members of the Society. One does not see any such picture in lymphatic dilitation or inflammatory tissue as Dr. Smith suggests. The endothelial reduplications which were pointed out on many of the slides do not occur in such conditions, but are characteristic of angiomata. One of the conclusions reached in this paper is that hemangiomata are more frequent in occurrence than is generally believed. Dr. Kramer did not think Dr. Smith justified in casting doubt on the report simply because so many more cases were reported here than by formed observers. The microscopic slides were here and could be examined by anyone desiring to do so. He repeated that they had all been gone over by Dr. F. S. Mandlebaum, Director of the Pathological Laborattory of Mt. Sinai Hospital, New York City.

Dr. Smith's statements concerning these growths were somewhat confused; one could not just make out whether he referred to lymphangiomata or to hemangiomata. Dr. Kramer assumed that Dr. Smith's remark concerning bibliography referred to the lymphangiomata. There had been a case reported by Knight in 1888, in the *Boston Medical and Surgical Journal* which cannot be accepted as an authentic case. The pathologist said that the tissue submitted was in such poor condition that a definite diagnosis could not be made, but he got the impression that the growth was a lymphangiectasis. Since that time only eight cases of lymphangioma have been reported.

Dr. Eggston had questioned the pathological diagnosis one one or two of the cases because the symptoms were only of short duration. Dr. Kramer stated that the diagnosis of hemangioma and lymphangioma was entirely a histological one and could not be made in any way except by microscopic examination of the tissue. The duration of symptoms was of no significance in the diagnosis of angiomata.

Presentation of Specimens. Dr. Sydney Yankauer.

DR. YANKAUER first dwelt upon the necessity imposed upon laryngologists for impressing upon the general practitioner and the public generally the importance of avoiding the inspiration of foreign bodies. If the public generally can be impressed with the necessity of guarding children from putting things in their mouths a large number of these accidents can be prevented.

He then showed a whole batch of coins removed from children. The public should have their attention called to this matter. Such things as

bones go down with the food, and their inhalation is perhaps unavoidable, but placing small toys in the hands of small children should be stopped; they could be prevented from swallowing them.

He then showed three instances of egg shells taken from the larynx and bronchi. When a nurse feeds a soft-boiled egg to a child there is no excuse for letting the egg shell go in with the egg. That is an accident which is absolutely preventable.

Two veil pins and two straight pins were inhaled because the patients held them in their mouths while dressing.

An upholsterer will fill his mouth with tacks and inhale them with his work. They should be taught not to do that.

Then there are dental accidents. Here are two teeth dropped by dentists and inhaled by the patients. There are quite a number of such accidents.

Here is the vertebra of a chicken, which is interesting. I have removed three chicken vertebrae from lung abscesses. These vertebrae are lodged in a bronchus and the patient breathes through the hole.

Here is a small piece of rubber tubing. The boy from whom that was removed was eight years old and was tonsillectomized. Then he had asthma, and when he got into the hands of a general practitioner who had had some experience with inhaled foreign bodies, he suspected a foreign body and had the boy X-rayed, and discovered the rubber tubing, which was removed. That is just the kind of tubing which is used for intranasal anesthesia, and it was ascertained later that a piece of tubing was cut off by the snare when the tonsil was taken out. It is just as well to remember that such things can happen.

This piece of cartilage was one of the largest things I have ever taken out of the esophagus—it had some food above it. It had to be caught on a hook to remove it, as I had no forceps which would open wide enough to grasp it.

These two checkers were removed from an insane patient.

Carcinoma of Left Auricle of the Heart Diagnosed by Bronchoscopy. Dr. Sydney Yankauer.

This is a case of carcinoma of the mediastinum involving the heart. Cardiac symptoms were present (auricular fibrillation). Bronchoscopic examination revealed a growth extending into the right bronchus, from which we removed a specimen; but the left bronchus was compressed from below upward, and knowing the anatomy it was not difficult to guess that the heart was touching if not involved in the new growth. Autopsy proved that to be so.

SECTION ON OTOLOGY.

February 8, 1924.

Lantern Demonstration of Personal Researches into the Structure of the Internal Ear. Dr. George E. Shambaugh, Chicago, Ill.

Dr. Shambaugh presented by means of lantern slides the following series of anatomical problems that he had undertaken to work out in connection with the structures of the internal ear:

I. Distribution of Blood Vessels in the Labyrinth of the Ear: He first undertook to work out the blood vessels in the labyrinth of the ear of the domestic pig. The method used was that of making celloidin casts of injected preparations. He pointed out that the most striking difference which he discovered in the pig's ear from that described by Eichler and Siebenmann in their work on the blood supply of the human ear lay in the exit of blood vessels from the labyrinth. Dr. Shambaugh found that all of the venous blood was collected into a single vessel which left along the aqueductus cochlea whereas Siebenmann had found blood vessels leaving the aqueductus vestibuli as well and also, rather indefinite, a vein

which he assumed drained blood from the labyrinth and which was found in the internal auditory meatus.

Dr. Shambaugh next undertook to work out the distribution of blood vessels of the sheep and the calf. In the sheep all the veins again left through the aqueductus cochlea. In the calf, as an occasional variation, the vein from the crus communi turned back and found its way out of the labyrinth along the aqueductus vestibuli.

Later on he also worked out the blood supply for the dog and the human ear. In the dog two vessels drain the labyrinth, one through the aqueductus cochlea and one through the aqueductus vestibuli. The same thing he found in the human ear. Individual variations were found in the latter regarding the distribution of the venous blood between these two vessels. He presented a lantern slide which showed the distribution of the arterial system and the manner in which various areas in the labyrinthine end organs could be separately involved in pathological conditions as the result of lesions involving this or that branch of the arterial tree.

In connection with the blood supply of the internal ear he also undertook a research to determine whether any of the blood vessels which supply endosteum of the labyrinth cavities and the membranous labyrinth also supply the bony capsule. He pointed out that if such a condition could be shown to exist, we would have a ready means for accounting for the extension of infection from the middle ear to the labyrinth since it is well known that the blood vessels which supply the mucous membrane and the periosteum of the inner wall of the tympani also supply the bony capsule of the labyrinth. He found that in the calf the blood vessels of the labyrinth enter the capsule.

II. He next showed *a series of lantern slides of histology* in which were illustrated the several stages in the development of the membranous labyrinth and discussed the method by which he was able to secure this unusual series of sections.

III. A Series of Lantern Slides—Microphotographs of the Cochlear structures. A. Exhibition of the sections which demonstrate how he solved the problem of the origin of the cells found in the deeper layers of the stria vascularis by studying the development of this interesting structure.

B. Showed a series of lantern slides demonstrating the peculiar structure of the epithelium in the region of the sulcus spiralis externis how clumps of epithelium penetrate into the spiral ligament and form a glandular structure. His conclusion is that this is in the nature of a secreting mechanism probably for supplying the endolymph.

C. He demonstrated microphotographs of the organ of Corti in which were shown the following contributions which he made to our knowledge of this structure:

1. The attachment of the hair cells to the tectorial membrane, a relationship which has since been verified by Professor Hardesty and others. He pointed out the bearing which this relationship has upon such theories of sound perception as the Ewald theory where the conception is that each tone in the scale produces wave like vibrations throughout the entire length of the organ of Corti.

2. Demonstration that the streifen of Hensen which is found on the under surface of the tectorial membrane is a facet for attaching the membrana tectoria to the supporting cells just interior to the tunnel of Corti.

3. Demonstration of a series of histological sections of the membrana basilaris near the beginning of the basal coil showing how in this region the membrana basilaris loses all resemblance to a possible vibrating structure.

IV. Illustration of the Results of His Work on the Histology of the end organs comprising the vestibular mechanism, that is, the crista acustica of the semi-circular canals and the macula acustica of the utricle and saccule.

In conclusion he gave a brief summary of the bearing which his researches on the structures of the cochlea has on theories of sound perception and the deductions based upon his work on the minute structure of the vestibular end organs on their function. He pointed out that the clinician who observes the disturbances set up by injuries to the vestibular mechanism cannot but be impressed by the fact that disturbances in equilibrium thus produced are much more significant than any disturbances in orientation. He discussed the function of the crista acoustica by pointing out several experiments which illustrated the way in which these end organs give us our sense of movement in a direct line and our sense of position in space. He concluded by giving a very brief summary of his hypothesis regarding the origin of labyrinth tonus which is that the constant stream of tonus impulses emanating from the semicircular canals is dependent upon the constant to and fro motion of the endolymph set up by the pulsations in the labyrinth vessels and made possible by means of the ductus endolymphaticus opening into the larger saccus endolymphaticus on the posterior aspect of the petrous bone. This hypothesis he advanced in his original contribution to the anatomy of the vestibular mechanism published in 1912. Barany only recently has published a series of clinical observations verifying this hypothesis and recently Professor Portmann of Bordeaux has given a demonstration in this country of the disturbances in equilibrium set up when the ductus endolymphaticus is destroyed which demonstration is a direct confirmation of the hypothesis advanced by Dr. Shambaugh.

DISCUSSION.

DR. FRANK H. PIKE (Columbia University) said that for some years he had worked in another gray stone building not many yards south of the one where Dr. Shambaugh worked, and as he saw the work shown on these slides it seemed a good deal like the sensation some people described as "getting money from home".

Soon after he went to Chicago he strayed into the anatomical laboratory and learned from Professor Bensley that some one was doing research work on the ear. Later on he met Dr. Shambaugh. He recalled very distinctly the shaking of the faith which some felt when they saw that the tectorial membrane was not floating around but actually attached to the organ of Corti. It seemed almost unbelievable, yet there were the slides. "Since then we have found that the universe goes on very much as before, except that we know a little more about the ear." Then we were told of the resonance theory and that the membrana tectoria was doing something else. That was another very severe shock to the fundamentalists, and some people who were supposed to have a right to an opinion on the facts rather condemned Dr. Shambaugh's ideas. I did not then have enough sense to know what I did believe, but I know better now, and feel that Dr. Shambaugh was perfectly justified for the stubborness showed at that time in refusing to accept tradition, and going ahead on his own responsibility, finally demonstrating the conclusions he believed in; it has given us a different idea of hearing altogether. It requires one kind of courage for all of us to go into one group or to go out for some common opinion; it requires an entirely different kind of courage for one man to depart from the crowd and stick to the point he has held.

It is not necessary for me to say anything about the anatomy, but I wanted to mention these two things as part of my appreciation of the work done by Dr. Shambaugh and the spirit he has shown.

DR. ELWYN expressed his appreciation of the work shown in such perefction and asked if Dr. Shambaugh would give his interpretation of two points.

1. Since the cochlear duct was ectodermal in origin, were not the glands which Dr. Shambaugh describes modified sweat glands which poured their secretion as endolymph into the cochlear canal. That the mixture of epithelial cells and connective tissue cells in the striae vascularis were perhaps expressions of papillar formation, as in other parts of the skin.

2. The sense organs of the inner ear are peculiar in so far that they have a non-cellular secondary membrane in contact with the sensory cells. Such are the otolithic membranes of the maculae, the cupola of the cresta and the tectorial membrane of the cochlea. These membranes are the parts primarily receiving the stimuli, then transmitting them to the sensory epithelium with which the nerve fibres are connected.

DR. FRIESNER said there was surely nothing he could add that would compare with the observations made by Dr. Shambaugh, but he wished to express his deep appreciation of the work which was undoubtedly the best of the kind he had ever seen. It was the work of almost a lifetime. Unless one had himself done some of this kind of work he could not realize what a stupendous effort had been made and how much had been crowded into a few minutes. He would like to listen to Dr. Shambaugh for a week.

BOOK REVIEW.

Aromatics and the Soul: A Study of Smells. By Dr. Dan McKenzie, Hoeber, New York. 164 pp., 8 vo.

Dr. Dan McKenzie aptly characterizes his little volume in terming his preface, "the gateway to my little pagoda of perfumes". In this pagoda the amateur may browse among the censers, the rose-petal jars, the attar flasks—and, yes a few stink-pots, and lose himself the while in the charming atmosphere of Dr. McKenzie's personality.

This work, while thoroughly scientific, is addressed to the intelligent layman, rather than to the scientist. The little pagoda stands midway between the laboratory of Zwaardemaker and the museum of Huysmans.

There is a prominent chapter on the Sense of Olfaction in Lower Animals which recounts in some detail the observations of Fabre, upon the Peacock and Banded Moths, and touches upon the olfactory characters of certain mammals, reptilia and even fish.

An exhaustive chapter upon the Theories of Olfaction reviews the subject thoroughly, and compares the Undulatory Theory of Heyninx, and its fore runners, with Castelli's theory of light-wave absorption by the ocular pigment. It includes the classifications of Zwaardemaker and Heyninx.

Most interesting to the general reader, perhaps, are the pages devoted to the effects upon our manners and customs of olfactory experiences. "Smell is speechless", declares the author. He points out that the other senses are represented by myriads of characteristic definite terms. Vision is represented by the names of the colors, their shades, chromes and values. Hearing has its long list of onomatopoetic terms. Touch and taste are well represented. "Even the sense that governs equilibration, of which the consciousness in normal conditions is never aware, has furnished us with 'giddy' and 'dizzy'." But smell borrows its terms from the other senses—a thing smells "like" some odiferous object. "We never say, e. g., "This is the smell called 'dank', in the precise way we can say: "That color is green", or "That sound is a whistale'."

Follows an illuminating dissertation on smell in folklore, in ancient and medieval medicine, and in personality. Altogether it is an entertaining book, whimisical and full of curious information. "Let us get out into the fresh air again", invites the penultimate paragraph. The reader is not so ready to go. It has been pleasant browsing among the perfumes, the censers, the attar flasks—and the rest.

A. W. P.